

Salla Toppinen-Tanner

Process of burnout: structure, antecedents, and consequences



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Salla Toppinen-Tanner

**People and Work
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Finnish Institute of Occupational Health,
Helsinki, Finland

ABSTRACT

The major changes that have been witnessed in today's workplaces are challenging the mental well-being of employed people. Stress and burnout are considered to be modern epidemics, and their importance to physical health and work ability has been acknowledged world-wide.

The aim of the thesis was to study the concept of burnout as a process proceeding from its antecedents, through the development of the syndrome, and to its outcomes. Several work-related factors considered antecedents of burnout were studied in different occupational groups. The syndrome of burnout is seen as consisting of three dimensions – exhaustion, cynicism and lack of professional efficacy – and different alternatives for the sequential development of these dimensions were tested. Furthermore, several indicators of the severely detrimental health and work ability outcomes of burnout were investigated in a longitudinal study design.

The research questions were as follows. 1) Is burnout, as measured with the Maslach Burnout Inventory – General Survey (MBI-GS), a three-dimensional construct and how invariant is the factorial structure across occupations (Finnish) and national samples (Finnish, Swedish and Dutch)? How persistent is exhaustion over time? 2) What is the sequential process of burnout? Is it similar across occupations? How do work stressors relate to the process? 3) How does burnout relate to severe health consequences as well as temporary and chronic work disability according to hospitalization periods, sick-leave episodes and receiving disability pensions?

The data were collected between 1986 and 2005. The population of the study consisted of respondents to a company-wide questionnaire survey carried out in 1996–1997 (N=9705, response rate 63%). The participants comprised 6025 blue-collar workers and 3680 white-collar workers. The majority were men (N=7494) and the average age was 43.7

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years. In addition, a sample from the population had responded to a questionnaire survey in 1988, which was combined with the 1996 data to form panel data on 713 respondents. The register-based data were collected between 1986 and 2005 from 1) the company's occupational health services' records for a sample of respondents from the 1996 questionnaire survey (sick-leave data), 2) hospitalization records from the Hospital discharge register, and 3) disability pension records from the Finnish Centre for Pensions. These data were combined person by person with the 1996 questionnaire survey data with the help of personal identification numbers which were saved with the study numbers by the researchers.

The results showed that burnout consists of three separate but correlating symptoms: exhaustion, cynicism and lack of professional efficacy. As a syndrome, burnout was strongly related to job stressors at work, and seemed to develop from exhaustion through cynicism to lack of professional efficacy in a similar manner among white-collar and blue-collar employees. The results also showed that exhaustion persisted even after eight years of follow-up but did not predict cynicism or lack of professional efficacy after that amount of time. Nor were job stressors longitudinally related to burnout.

Longitudinal results were obtained for the severe health-related consequences of burnout. The investigated outcomes represented different phases of health deterioration ranging from sick-leaves and hospitalization periods to receiving work disability pensions. The results showed that burnout syndrome, and its elements of exhaustion and cynicism, were related to future mental and cardiovascular disorders as indicated by hospitalization periods. Burnout was also related to future sick-leave periods due to mental, cardiovascular and musculoskeletal disorders. Of the separate elements, exhaustion was related to the same three categories of disorder, cynicism to mental, musculoskeletal and digestive disorders, and lack of professional efficacy to mental and musculoskeletal disorders. Burnout also predicted receiving disability pensions due to mental and musculoskeletal disorders among initially healthy subjects. Exhaustion was related to receiving disability pensions even when self-reported chronic illness was taken into account.

The results suggest that burnout is a multidimensional, chronic, work-related syndrome, which may have serious consequences for health and work ability.

YHTEENVETO

Työelämän muutokset asettavat työntekijöiden jaksamisen koetukselle. Stressin ja työuupumuksen suuri merkitys terveyden uhkana on tunnustettu sekä inhimillisesti että taloudellisesti. Vaikka työuupumusta on tutkittu paljon, ilmiöön liittyy selvittämättömiä kysymyksiä. Tämän väitöskirjan tarkoituksena oli tutkia työuupumuksen kehittymistä kokonaisuutena: oireyhtymän rakennetta ja kehittymistä, sitä ennustavia työolotekijöitä sekä työuupumuksen seurauksia terveydelle ja työkyvyille.

Tutkimuksen tavoitteena oli selvittää seuraavia asioita:

1. Onko työuupumus kolmiulotteinen oireyhtymä, johon kuuluvat ekshaustio, kyynistyneisyys ja alentunut ammatillinen itsetunto, ja onko oireyhtymän rakenne pysyvä eri ammattiryhmillä ja kansallisuuksilla? Onko ekshaustio luonteeltaan pysyvää?
2. Miten työuupumuksen oireet etenevät, ja kehittyykö työuupumus samalla tavalla eri ammattiryhmissä? Mitkä työn stressitekijät selittävät työuupumuksen kehittymistä?
3. Mitä seurauksia työuupumuksella on terveydelle ja työkyvyille, kun niitä arvioidaan sairaalajaksojen, sairauspoissaolojen ja työkyvyttömyyseläkkeiden riskillä ja eri diagnoosiluokissa?

Tutkimuksen aineisto kerättiin vuosien 1986 ja 2005 välisenä aikana. Tutkimuksen perusjoukkona olivat kaikki vuosina 1996–1997 henkilöstön hyvinvointia koskevaan kyselyyn vastanneet 9 705 (63 %) metsäteollisuuden työntekijää ja toimihenkilöä. Tutkimukseen osallistuneista 6 025 oli työntekijöitä ja 3 680 toimihenkilöitä. Enemmistö osallistujista (N = 7 494) oli miehiä ja keski-ikä oli 43,7 vuotta. Osa koko henkilöstöstä oli vastannut kyselyyn aiemmin vuonna 1988 (N = 713), ja he muodostavat

tämän tutkimuksen ensimmäisen seuranta-aineiston. Lisäksi kerättiin vuosina 1986–2005 1) sairauspoissaolotiedot yrityksen työterveyshuollon rekisteristä, 2) sairaalajaksoja koskevat tiedot Terveyden ja hyvinvoinnin laitoksen rekisteristä ja 3) työkyvyttömyyseläkkeitä koskevat tiedot Eläketurvakeskuksen rekisteristä. Nämä tiedot yhdistettiin henkilöittäin vuoden 1996 kyselytutkimuksen tietoihin.

Tulokset osoittivat, että työuupumus koostuu kolmesta toisiinsa yhteydessä olevasta, mutta erillisestä ulottuvuudesta: ekshaustio, kyynistyneisyys ja alentunut ammatillinen itsetunto. Työn ja työyhteisön piirteistä työn arvostuksen puute, aikapaine, työroolin epäselvyys ja työyhteisön ristiriidat olivat yhteydessä työuupumukseen. Työuupumus oli luonteeltaan pysyvää, sillä ekshaustio selitti myöhempää ekshaustiota jopa kahdeksan vuoden jälkeen. Osittain tästä johtuen työn stressitekijöillä oli vähäisempi yhteys myöhempään työuupumukseen, ja työn piirteiden vaikutus näkyi erityisesti samaan aikaan mitatun työuupumuksen selittäjänä. Oireet etenivät samalla tavalla ekshaustiosta kyynistyneisyyden kautta ammatillisen itsetunnon heikentymiseen sekä toimihenkilöillä että työntekijöillä.

Työuupumuksen seurauksista tutkittiin pitkittäisasetelmassa terveyden ja työkyvyn heikkenemistä. Sairaalajaksot, sairauspoissaolot ja työkyvyttömyyseläkkeet edustivat tutkimuksessa vakavuudeltaan erilaisia työuupumuksen seurauksia. Tulokset osoittivat, että työuupumus, ja ekshaustio ja kyynistyneisyys sen ulottuvuuksista, lisäsivät tulevien sairaalajaksojen riskiä mielenterveysongelmien tai sydän- ja verisuonisairauksien takia. Työuupumus ennusti myös sairauspoissaoloja, joiden syy on mielenterveys-, sydän- ja verisuoni- ja tuki- ja liikuntaelinsairaus. Erillisistä oireista ekshaustio oli yhteydessä näihin kolmeen, kyynistyneisyys mielenterveys-, tuki- ja liikuntaelin- ja ruoansulatuselimistön sairauksiin ja ammatillisen itsetunnon heikkeneminen mielenterveys- ja tuki- ja liikuntaelinsairauksiin. Työuupumus myös ennusti uusia työkyvyttömyyseläkkeitä, jotka perustuvat mielenterveys- ja tuki- ja liikuntaelinsairauksien diagnooseihin. Ekshaustio oli yhteydessä työkyvyttömyyseläkkeisiin itseraportoitujen kroonisten sairauksien vaikutuksen vakioimisen jälkeenkin.

Tämän väitöskirjan tulokset osoittavat, että työuupumus on moniulotteinen, krooninen, työhön liittyvä oireyhtymä, jolla voi olla vakavia seurauksia terveydelle ja työkyvylle.

LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following original publications, which are referred to with Roman numerals I–V. The original articles have been re-published in this report with the permission of the British Psychological Society (I), John Wiley and Sons (II and III), Taylor & Francis (IV), and Elsevier (V).

- I Schutte, N., Toppinen, S., Kalimo, R. & Schaufeli, W. (2000). The factorial validity of the Maslach Burnout Inventory – General Survey (MBI-GS) across occupational groups and nations. *Journal of Occupational and Organizational Psychology*, 73, 53–66.
- II Toppinen-Tanner, S., Kalimo, R. & Mutanen, P. (2002). The process of burnout in white-collar and blue-collar jobs: eight year prospective study of exhaustion. *Journal of Organizational Behavior*, 23, 555–570.
- III Toppinen-Tanner, S., Ahola, K., Koskinen, A. & Väänänen, A. (2009). Burnout predicts hospitalization for mental and cardiovascular disorders: 10-year follow-up study. *Stress & Health*, 25, 287–296.
- IV Toppinen-Tanner, S., Ojajarvi, A., Väänänen, A., Kalimo, R. & Jäppinen, P. (2005). Burnout as a predictor of medically certified sick leave absences and their diagnosed causes. *Behavioral Medicine*, 31, 18–27.
- V Ahola, K., Toppinen-Tanner, S., HUUHTANEN, P., Koskinen, A. & Väänänen, A. (2009). Occupational burnout and chronic work disability: An eight-year cohort study on pensioning among Finnish forest industry workers. *Journal of Affective Disorders*, 115, 150–159.

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1. INTRODUCTION

The major changes that have been taking place in today's workplaces challenge the mental well-being of employed people. Stress and burnout are considered the epidemics of modern society, and their importance to physical health and work disability has been acknowledged worldwide (Hallsten, 2005; Schaufeli, Leiter & Maslach, 2009; Spielberger & Reheiser, 2005). The continuing importance of burnout phenomenon and studying burnout is based on at least three issues: 1) Burnout is quite prevalent and has been shown to be an economic, human and social burden to societies and individuals, 2) burnout is very stable, which makes preventing it before it occurs even more important, and 3) it is possible to prevent burnout through workplace development and health promotion. Although only 3–7% of population suffers from serious burnout, this means that tens of thousands of people have difficulties in maintaining their work ability and well-being in their everyday activities (Ahola et al., 2004; Kalimo & Toppinen, 1997; Schaufeli, 2003; Shirom, 2009).

This thesis tries to answer some questions that still remain open or controversial in burnout research (Cox, Tisserand & Taris, 2005). These questions relate to the process of burnout and can also be related to its practical implications: What is the content and structure of burnout? How does burnout develop? Are there differences in the burnout process across occupations? What kind of negative consequences does burnout have on future work ability and health? Answers to these questions can help in solving several practical challenges: How to recognize burnout early enough? What are the relevant targets for preventing burnout? Should we strive to find universal theories on burnout and general guidelines for its prevention or do we need specific or tailored programs? And finally, what is the price for not investing in prevention of burnout in terms of poor health and disability?

The introduction deals with several issues related to the burnout concept as a whole. First, a general introduction to the concept is presented. The factorial structure of the burnout measure, the determination of the burnout scores and their cut-off points, the sequential development of the different dimensions, the occupational antecedents, and the health-related consequences of burnout all relate to the discussion on the burnout phenomenon.

1.1 Concept of burnout

In the 1970s and the early 80s, researchers and clinicians in the USA recognized a phenomenon among professionals doing emotionally demanding work with people, such as social work, voluntary work, law, or police. Committed, involved and enthusiastic young working people ended up in a situation where they felt drained of energy, at the end of their rope, no longer feeling enthusiasm and energy, but feeling exhausted, detached from their work, and without accomplishment. These people were experiencing symptoms of burnout (Leiter & Maslach, 1988; Maslach, 2003; Maslach & Jackson, 1981). One of the pioneers in this field, Christina Maslach, published the first version of the Maslach Burnout Inventory with her colleague Susan Jackson in 1981 (Maslach & Jackson, 1981). This measure then became the “golden standard” for measuring burnout. During the past 30 years, thousands of articles and books have appeared indicating the huge interest in this phenomenon. Several thorough reviews, books, and special issues of international journals have also been published on the burnout phenomenon. (For reviews, see Cordess & Dougherty, 1993; Halbesleben & Buckley, 2004; Lee & Ashforth, 1996; Schaufeli & Buunk, 2003; Schaufeli & Enzmann, 1998; Schaufeli, Leiter & Maslach, 2009; Schaufeli, Maslach & Marek, 1993; *Psychology & Health*, 2001: 16 (5); *Stress and Health*, 2009: 25 (4); and *Work & Stress*, 2005: 19 (2).)

Burnout is defined as a chronic stress reaction and in practice, the roots of burnout theories are mainly in *general stress theories*, which emphasize the interaction between work characteristics and the employee (see Schaufeli & Enzmann, 1998). Many of the original theories on burnout have not been empirically tested (see Schaufeli & Enzmann,

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1998 for a review). On the contrary, most of the empirical investigations are based on theories from other lines of research. One of the most influential general theories has been the Person Environment – Fit Theory (PE-Fit theory) (French, Caplan & Van Harrison, 1982; Edwards, 1996), according to which, an imbalance between demands and opportunities in the working environment and skills and expectations of the employee is the most important antecedent of the process of stress and deteriorating health. The workplace stress that occurs as a result of this wrong fit produces psychological strain that may contribute to physical disorders (French, Caplan & Harrison, 1982). The PE-Fit theory is, however, not very specific and does not take individual variables into consideration. (For a review, see Spielberger & Reheiser, 2005.) Lazarus and Folkman (1984) added individual perception and evaluation of the situation and of one's possibilities to manage the situation into the theory, stressing its interactive nature. On a general level, the working definition of burnout by Schaufeli and Enzmann (1998) also highlighted the role of the mismatch of intentions and reality at the job and inadequate coping strategies. These authors provided an integration model which focused on the role of coping in developing either 'positive gain' or 'negative loss spirals' (Schaufeli & Enzmann 1998). Individual-level factors can affect the process in all of its phases (Kahn & Boysiere, 1992). According to the 'Conservation of resources', people value and are motivated to obtain, maintain, and protect resources (objects, conditions, personal characteristics, and energies). Burnout is expected to occur when these resources are threatened or lost, or when a person invests resources but fails to regain them (Hobfoll & Freedy, 1993).

Several *other influential theories* on specific working conditions as the core factors have been applied in burnout research. The most important theories used have been the Job Strain (or the Demand-Control) model (Karasek, 1979; Karasek & Theorell, 1990) and the Effort-Reward-Imbalance (ERI) model (Siegrist, 1996). According to the Job Strain model, a combination of high job demands and low job control increases the risk of a high-strain situation at work. Likewise, according to ERI, a combination of high effort and low rewards constitutes a threat to individual well-being (Peter & Siegrist, 1997; Siegrist, 1996). These theories have been widely used and have also received empirical support (Ahola et al., 2006b; Ahola & Hakanen, 2007; Kivimäki et al., 2006; Van der Doef & Maes, 1999).

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Among the burnout researchers, *new models* have been developed, some of which were based on the MBI and empirical evidence obtained by this measure, such as the process model (Leiter, 1993), which has similarities with the job demands-resources model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001b). According to the process model, exhaustion and depersonalization form a sequential process, and lack of accomplishment develops separately as a consequence of poor organizational environment. According to the job demands-resources model, job demands are primarily related to the exhaustion component of burnout, whereas (lack of) job resources are primarily related to disengagement, and lack of accomplishment is not included (Demerouti et al., 2001b). Some of the other influential theories are based on social exchange theories (see Schaufeli, 2006 for a review) or the conservation of resources theory (Hobfoll & Freedy, 1993). The first focuses on social comparisons people make when they evaluate the work environment, such as fairness at work. The latter seems to be the most influential, especially in recent studies on job engagement, which was originally defined as the opposite of burnout (see Maslach & Leiter, 1997; Schaufeli, Salanova, González-Romá & Bakker, 2002). The theory stresses the importance of loss of resources in the development of burnout (Hobfoll & Freedy, 1993) and gives a valuable contribution to burnout theories by giving bases for studying reciprocal relationships and 'loss spirals' in relation to burnout (Hakanen, 2004).

Some other researchers (most of whom did not use the MBI or its modifications) argue that burnout is not necessarily work-related, but can be found among the unemployed, for example (e.g., Hallsten, 2005). The mainstream of burnout psychology does consider burnout to be work-related, which also makes it more differentiable from other related constructs, such as depression (Schaufeli & Taris, 2005). In order to clarify the work-relatedness, the terms 'job burnout', 'professional burnout', and 'occupational burnout' have been used (Ahola, 2007; Schaufeli, Maslach & Marek, 1993).

Most of the burnout theories share some basic assumptions about the nature of burnout development. According to Schaufeli and Enzmann (1998, p. 36), the following common elements can be found in most of the burnout theories: 1) predominance of fatigue symptoms, 2) various atypical symptoms occur, 3) symptoms are work-related, 4) symp-

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toms manifest in normal persons without major psychopathology, and 5) decreased effectiveness and impaired work performance occurs because of negative attitudes and behaviours. It is not only emotionally strainful 'people work' which causes symptoms of burnout, but this syndrome is experienced in many occupations where the work pace has increased and the demands of work have rapidly grown. In general, burnout is linked to overburdening work experiences, which are chronic in nature, as well as constant conflict between different roles or between important values and personal expectations (Cordes & Dougherty, 1993; Jackson, Schwab & Schuler, 1986; Maslach & Goldberg, 1998). Stressing the interaction between man and work as the root cause of burnout also emphasizes the nature of burnout as a process rather than a state.

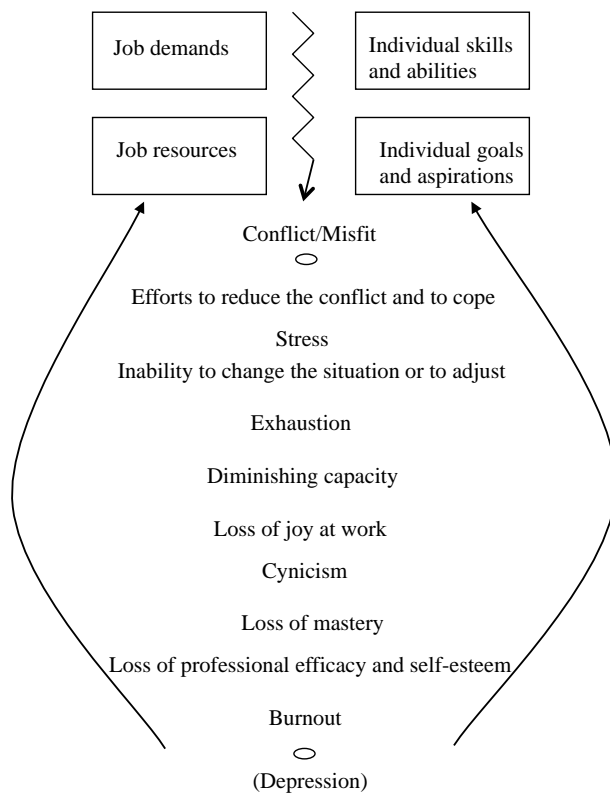


Figure 1. Process of burnout (from Kalimo & Toppinen, 1997).

The process model of burnout follows the theory of Maslach and others (1996), which is also based on the P-E-fit theory (Edwards, 1996) (Figure 1). According to this model, the process starts from the mismatch between the employee and his/her work, which it is assumed causes stress (Maslach & Goldberg, 1998; Maslach et al., 1996). If the stressful situation is not solved, adjustment is not possible, or the situation remains unchanged, this will then lead to burnout symptoms, beginning with exhaustion and diminished capacity, through cynicism, and eventually to loss of professional efficacy (Maslach, Jackson & Leiter, 1996). Finally, if not treated, burnout may lead to depression or other illness (Ahola & Hakanen, 2007; Greenglass & Burke, 1990; Hättinen et al., 2009). The model also assumes that burnout has reciprocal relationships with work characteristics and the perception of one's resources and performance, which can be described as a loss spiral (Figure 1).

1.2 Operationalization of burnout

1.2.1 The Maslach Burnout Inventory – General Survey: factorial structure and persistence

The realization of the fact that many people outside the human service sector also suffer from symptoms of burnout led to the development of a general version of the most widely used measure of burnout, the Maslach Burnout Inventory-General Survey (MBI-GS) in 1996 (Schaufeli, Leiter & Kalimo, 1995; Maslach et al., 1996). The Finnish version of the MBI-GS was published in 2006 (Kalimo, Hakanen & Toppinen-Tanner, 2006).

In the MBI-GS, *exhaustion* refers to feelings of overstrain, tiredness, or fatigue resulting from emotional overtaxing work. *Cynicism* reflects an indifferent attitude towards work, losing one's interest, and the meaning of work. Professional efficacy consists of feelings of competence, successful achievement, and accomplishments in one's work. Thus, *lack of professional efficacy* as a dimension of burnout means losing one's feeling of accomplishment or continued effectiveness in one's work (Maslach et al., 1996).

Dutch, Canadian, and Finnish samples were used for the development and validation of the MBI-GS measure (Schaufeli et al., 1995), and the

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3-factorial validity of the final version of the measure has been confirmed in separate occupational and national samples (Bakker, Demerouti & Schaufeli, 2002; Demerouti et al., 2001b; Kalimo & Toppinen, 1997; Kitaoka-Higashiguchi et al., 2004; Hallberg, 2005; Langballe, Falkum, Innstrand & Aasland, 2006; Leiter & Schaufeli, 1996; Roelofs, Verbraak, Keijsers, de Bruin & Schmidt, 2005; Schreurs & Taris, 1998; Taris, Schreurs & Schaufeli, 1999). Internal consistency and test-retest reliability have been found to be good for both the original MBI (Maslach & Jackson, 1981; Schaufeli et al., 1993) and the MBI-GS (Maslach et al., 1996; Kalimo et al., 2006). Since no widely accepted measure of burnout applicable to all occupations had previously been in use, data on the prevalence of burnout in the whole working population (Ahola et al., 2004; Hallsten, 2005; Kalimo & Toppinen, 1997) and in different occupational groups, especially blue-collar occupations (Ahola et al., 2006a), is still scarce.

Burnout over time has been evaluated to be quite persistent (Bakker et al., 2000b; Boersma & Lindblom, 2009; Burisch, 2002; Capel, 1991; Greenglass & Burke, 1990; Golembiewski, Boudreau, Munzenrider & Luo, 1996; Hakanen, 2004; Jackson et al., 1986; Lee & Ashforth, 1996; Leiter, 1990; Maslach & Leiter, 2008; Peiro, Gonzalez-Roma, Tordera & Manas, 2001; Poulin & Walter, 1993: exhaustion; Taris et al., 2005). Usually the follow-up has been limited to some months. Only a few studies (e.g., Bakker et al., 2000b) have used longer than one-year follow-up study designs. (See Schaufeli & Enzmann, 1998; Taris, Le Blanc, Schaufeli & Schreurs, 2005 for a review and evaluation.) Recent person-oriented approaches to different clusters of burnout profiles also indicate the persistence of burnout over time (Boersma & Lindblom, 2009; Maslach & Leiter, 2008).

Taken together, research on the factorial validity of MBI-GS generally supports a correlated three-dimensional model, i.e., burnout consists of exhaustion, cynicism, and lack of professional efficacy. The invariance of the factor structure in different occupational samples has rarely been tested within the same organization, and there is little evidence on the prevalence of burnout in blue-collar occupations. Persistence of burnout has rarely been studied with a long follow-up design.

1.2.2 Other burnout measures and limitations concerning the use of the MBI-GS

Due to the lack of consensus regarding the concept of burnout and the different burnout measures used in empirical research, one of the central questions is still whether burnout consists of one, two, or three dimensions (Cox, Tisserand & Taris, 2005). The question whether to use a total score of burnout (unidimensional) or its three dimensions separately (multidimensional) has led to development of new versions of the MBI or new measures. A lot of this discussion stems from the empirical roots of the conceptual definition of burnout, and the empirical results obtained from structural models investigating the concept (Kristensen, Borritz & Villadsen, 2005). Even in the Maslach Burnout Inventory Manual (Maslach et al., 1996), the use of a total composite score for burnout is not recommended.

The most important other definitions of burnout focus on exhaustion as their core element (for a review, see Schaufeli, Enzmann & Girault, 1998). One of the pioneers of burnout research, Ayala Pines (Pines & Aronson, 1988), defined burnout as a state of physical, emotional, and mental exhaustion caused by long-term involvement in emotionally demanding situations. Different forms of exhaustion are also included in the Shirom-Melamed Burnout Measure (SMBM) (see Shirom, 2003), which defines burnout as an affective state characterized by depletion of physical fatigue, emotional exhaustion, and cognitive weariness, which can be represented by a single score of burnout (Shirom, 2005).

The original definition of burnout according to MBI has been criticized as not defining how any of the three components relate to antecedents and the consequences of burnout, i.e., the theoretical validity of burnout (see Enzmann, 2005; Demerouti, Verbeke & Bakker, 2005; Koeske & Koeske, 1989; Shirom, 2005). Consequently, numerous studies on possible work-related and other antecedents of burnout have been tested. The various results led to the hypothesis on differential relationships between job demand and job resource factors and the three burnout dimensions. Demerouti and colleagues further developed a version of the measure which excluded the lack of the professional efficacy dimension: the Oldenburg Burnout Inventory (OLBI) (Demerouti, Bakker, Vardakou & Kantas, 2003; Halbesleben & Demerouti, 2005).

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In most of the studies on burnout dimensions, exhaustion and cynicism have been more strongly correlated than either one with professional efficacy (Kalimo et al., 2006; Maslach, Schaufeli & Leiter, 2001; Schaufeli & Enzmann, 1998; Schaufeli & Taris, 2005). It has also been suggested that professional efficacy reflects a personality characteristic rather than a burnout symptom (Le Blanc, Hox, Schaufeli, Taris & Peeters, 2007; Schaufeli, 2003). Recently, it was suggested to include all three dimensions into the measure, but using a negatively worded scale of the professional efficacy dimension (Bresó, Salanova & Schaufeli, 2007; Schaufeli & Salanova, 2007). This suggestion was, however, based on a study on a sample of students and a slightly modified version of the original MBI measure.

The contents of the exhaustion dimension of the MBI instrument have been criticized (Enzmann, 2005). It has been pointed out that exhaustion as operationalized by the MBI measures a lack of energy or fatigue and does not really include the elements of emotional exhaustion caused by emotionally involving relationships with recipients and the quality aspects of work overload (see also Shirom, 2005). As professional efficacy is not always found to be related to the other two burnout symptoms, it is possible that energy depletion is necessary but not sufficient to generate diminished professional efficacy, because the latter is also related to the meaning and the quality of work (Enzmann, 2005).

There is a practical limitation concerning the use of MBI-GS in the scientific world. The measure was not published in scientific journals, but the use is limited to the purchasing customers of the publishing company. Perhaps partly because of this limitation, several other measures to conceptualize burnout have emerged recently. The developers of these measures also criticize the development of the MBI and claim that the individual items are arbitrary and the theory is based on the conceptualization (Kristensen et al., 2005). Most of these researchers, however, use the same theory of burnout as can be found behind MBI, e.g., the Bergen Burnout Indicator 15 (Näätänen, Aro, Matthiesen & Salmela-Aro, 2003) and the Copenhagen Burnout Measure (Kristensen et al., 2005). On the other hand, the publication of the third MBI made it very widely applicable, since it included the general version of the measure (the MBI-GS) for the first time. This measure has been successfully applied in different occupations and across nations.

1.2.3 A total score of burnout and cut-off scores for different levels of burnout

Syndrome is the association of several clinically recognizable features, signs (observed by a physician), symptoms (reported by the patient), phenomena or characteristics that often occur together, so that presence of one feature alerts the physician to the presence of the others (Wikipedia 9.7.2010).

Symptom is a departure from normal function or feeling which is noticed by a patient, indicating the presence of disease or abnormality. A symptom is subjective, observed by the patient, and not measured (Wikipedia 9.7.2010). <http://en.wikipedia.org>

According to the conceptual definition of burnout, it is a syndrome rather than a set of separate symptoms (Maslach, 2003; Maslach et al., 1996). The recommendation of not using a unidimensional burnout score is merely based on the lack of statistical guidelines or clinical research on the matter rather than burnout theory (Brenninkmeijer & van Yperen, 2003; Taris et al., 1999).

The use of the total score vs. its three dimensions and the use of cut-off points vs. continuous scores need to be considered when clinical or organizational use is being discussed. The Maslach Burnout Inventory manual warned against using cut-off scores to define high, intermediate, and low burnout groups, although it provides the means to do so. Schaufeli (2003) warned against using cut-off scores developed in another country. The Finnish version of the MBI-GS manual (Kalimo et al., 2006) provided cut-off scores to be used for categorizing people into high, intermediate, and low burnout groups and an index for calculating the total burnout score. These cut-off scores were based on the original response alternatives, which refer to how often the separate syndromes are being experienced. For example, if a respondent feels symptoms of exhaustion at least once a week, he/she is considered to be in the high exhaustion group. In addition, a composite sum scale of the individual symptom scores was formed on the basis of burnout theory and on the statistical analyses where mental work ability was used as criteria for defining the right coefficients for each individual symptom. Here, a

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rather cautious consideration was applied so that the total burnout score consists of 0.4 exhaustion, 0.3 cynicism, and 0.3 lack of professional efficacy, respectively (Kalimo, Pahkin, Mutanen & Toppinen-Tanner, 2003; Kalimo & Toppinen, 1997). This means that the exhaustion dimension is only slightly more emphasized in the total score compared to the other two dimensions.

There are different cut-off scores for categorization of burnout cases into low, intermediate, and high groups across different countries (Table 1).

The clinical validity of the Dutch version of the MBI-GS (MBI-DV) has been studied in relation to a neurasthenia diagnosis (ICD-10: F48.0) with work-related symptoms, and cut-off scores for clinical burnout and probable burnout cases have been determined (see Mohren et al., 2003; Roelofs et al., 2005; Schaufeli et al., 2001). Based on a comparison between two groups obtained by a clinical interview in which the ICD-10 diagnosis (F48.0) of work-related neurasthenia was used as an indicator of clinical burnout, and measuring burnout with the MBI-DV, it was concluded that the MBI-DV can be used for screening clinical burnout cases. The emotional exhaustion subscale differentiated between the burnout and the non-burnout group when the effects of depression and general psychopathology were controlled. In another study, depersonalization was also found to discriminate between individuals with and without clinical burnout (Schaufeli et al., 2001). The Dutch version of the inventory uses cut-off points based on ≤ 25 and ≥ 75 percentiles for each of the three dimensions in MBI-GS to detect a low and a high level group (Brenninkmeijer & Van Yperen, 2003; Schaufeli et al., 2001). Accordingly, a high total level of burnout is calculated as high exhaustion + high cynicism or high lack of professional efficacy according to manual norm scores (e.g., Bennet, Plint & Clifford, 2005).

Brenninkmeijer and Van Yperen (2003) provide instructions on when to use burnout as a continuous variable and when to use it as a dichotomous variable (as either having the total syndrome or not). From a clinical point of view, the burnout syndrome may show itself as a somewhat different phenomenon because burnout research suffers from a healthy worker effect in that research is usually conducted among relatively healthy employees. Also the median split has been used in some studies as a basis to determine low vs. high scores on subscales (Golembiewski et al., 1996; Maslach & Leiter, 2008).

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Table 1. Classification of burnout scores into low, mild, and severe burnout categories according to different guidelines.

	MBI-GS manual (Kalimo et al., 2006) ^a	MBI manual (Maslach et al., 1996) ^b	MBI-GS Dutch Version (Schaufeli et al., 2001) ^c
Total burnout	0–1.49 none/low 1.5–3.49 mild 3.5–6 severe	No total score of burnout recommended	exh=>2.40, AND either cyn=>2.25 OR lack of prof. effic. =>2.5 (high burnout AND high cynicism or low professional efficacy) Mild 2.20=>exh<3.80 and either 2.20<=cyn<2.59 or lack of PE <=2.44 Severe E=>3.80, and either C=>2.59 or lack of PE =>2.25
Exhaustion	0–1.49 no 1.5–3.49 mild 3.5–6 severe	<=16 low (1.77) 17–26 average (1.78–2.88)* >=27 high (2.89)	low <2.20 high =>2.20
Cynicism	0–1.49 no 1.5–3.49 mild 3.5–6 severe	<=6 low (1.39) 7–12 average (1.4–2.59) * >=13 high (2.6)	low <2.00 high =>2.00
Lack of professional efficacy	0–1.49 no 1.5–3.49 mild 3.5–6 severe	=>31 low (3.99) 38–32 average (4–4.87) * <=39 high (4.88) *	low <2.33 high =>2.33

^a The scores are based on the actual response scale, where respondents who have different symptoms weekly are classified as high exhaustion cases, etc. The total score of burnout is calculated as follows: Burnout=0.4 x E+0.3 x C+0.3 x lack of PE.

^b The scores are based on thirds of the norm population, i.e., 1/3 of the norm population received a score <=16 and were classified as low exhaustion cases.

^c The scores are based on quartiles of the norm population, in that 75% of the norm population received a score <2.20 for exhaustion and were classified as low exhaustion cases. Clinical burnout cases can also be categorized, corresponding with a group of patients corresponding with the ICD-10 classification for neurasthenia (see Mohren et al., 2003; Schaufeli, Bakker, Hoogduin, Schaap & Kladler, 2001).

* On a scale 0–6

The categorization of burnout into high, intermediate, and low burnout groups gives a 3–7% share of high burnout in the working population, which corresponds to numbers from the Swedish and Dutch studies (Ahola et al., 2004; Hallsten, Bellaagh & Gustafsson, 2002; Kalimo & Toppinen, 1997; Schaufeli, 2003). Using the MBI-GS in a national representative sample of the Dutch working population, it was estimated that 7.2% suffered from clinical burnout (6.5% in manufacturing). However, a comparison of different nations is difficult because the same norms cannot be applied across occupations, and it is not recommended to use the same cut-off scores, either (Schaufeli & Enzmann, 1998). In spite of the differences in the mean levels of burnout, it seems that similar kinds of profiles of burnout dimensions emerge between different countries (see Schaufeli & Enzmann, 1998).

To sum up, although the use of a burnout total score was not recommended in the Maslach Burnout Inventory manual, several alternative ways to calculate the total score and to determine cut-off scores have been presented. According to these guidelines, the prevalence of burnout in the working population is about 3–7%. However, there are only a few studies investigating the relationship between burnout syndrome, or severe burnout, and its antecedents or consequences.

1.3 Sequential development of burnout symptoms – contradicting views

Although the concept of burnout was developed to describe a multifaceted syndrome with three symptoms, the three dimensions have been separated in studies on burnout development. From the outset, there were no assumption about the sequential development of the burnout symptoms, as Taris and his colleagues warranted in their review on the articles which study the development of the syndrome (Taris et al., 2005). However, from a practical point of view, it is very important to study the possibility of finding early signs of developing burnout. By being able to recognize the early phases of burnout syndrome in people, it might be possible to identify risk groups and to prevent it or at least mitigate the more severe symptoms (Diestel & Schmidt, 2010; Lee & Ashforth, 1993b; Taris et al., 2005; Van Dierendonck, Schaufeli & Buunk, 2001).

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Five possible sequences for the development of the three burnout dimensions as measured with the MBI have been suggested (see Figure 2). Most of these models used the original MBI measure of burnout for the human services sector (Maslach Burnout Inventory – Human Services Survey (MBI-HSS) in the 3rd edition of the measure, Maslach et al., 1996). Golembiewski and others (1996) proposed a process model where depersonalization develops first as a coping strategy in stressful situations, followed by diminished personal accomplishment because of disturbed performance, and eventually ending up with emotional exhaustion. This model can also be regarded as 'the first profile model', as it categorizes burnout dimensions as low or high and uses different combinations of burnout dimensions to reflect different phases that individuals represent (e.g., Boersma & Lindblom, 2009; Härtinen, Kinnunen, Pekkonen & Aro, 2004; Härtinen et al., 2009).

The model by Leiter and Maslach (1988) suggested that emotional exhaustion develops as a consequence of overtaxing work demands, and consequently, one tries to cope with the situation by depersonalization, which in turn undermines accomplishment (Leiter & Maslach, 1988). This model received some empirical support in cross-sectional design (Cordes, Dougherty & Blum, 1997; Greenglass, Burke & Konarski, 1997; Lee & Ashforth, 1993b) and in longitudinal design by Bakker and others (2000b).

Leiter (1993) presented another version of this model where exhaustion leads to depersonalization or cynicism, and diminished personal accomplishment or efficacy develops separately (see also Bakker et al., 2000b; Cordes et al., 1997; Lee & Ashforth, 1993a; Lee & Ashforth, 1996; Maslach & Goldberg, 1998). This model is included in the third edition of the MBI Manual (Maslach et al., 1996). The Lee & Ashforth (1993b) version of the model includes professional efficacy in the model as a consequence of exhaustion. This model has also been empirically supported (Neveu, 2007).

Van Dierendonck and others (2001) suggested that lack of personal accomplishment – a key resource – influences depersonalization and depersonalization in its turn influences exhaustion (van Dierendonck et al., 2001). The most recent and only model based on a 3-wave panel study data tested all the previous models and suggested a combination of the previous models where exhaustion predicts depersonalization over

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time, and depersonalization is associated with future high exhaustion and lower levels of personal accomplishment (Taris et al., 2005). The results of the Taris et al. (2005) study were confirmed by a German 2-wave study using MBI and two different occupational samples (Diestel & Schmidt, 2010). These authors investigated the role of depersonalization as a moderator in different alternative models of burnout development. Depersonalization strengthened the effects of exhaustion over time and vice versa, and it also strengthened the effects of a lack of accomplishment over time.

The role of professional efficacy in the burnout process and phenomenon is still a very controversial issue. According to Schaufeli and Taris (2005), it can be seen either as a precursor (a lack of personal resources) or as a consequence (poor self-evaluation) of occupational fatigue, depending on one's perspective.

There are also some studies that tested the sequential development of burnout by including antecedents and/or consequences (Neveu, 2007) and personality factors in the models (meta-analytic model by Swider & Zimmermann, 2010). It seems that without these factors, the comprehensive models concerning the development of burnout remains more hypothetical. The use of multidimensional and multifaceted measures of burnout has been recommended because they can better capture employees as embedded in their organizational context (Demerouti et al., 2005).

In a meta-analysis, it was found that the sequential models differed according to the outcome in question (Swider & Zimmermann, 2010). For absenteeism, the process proceeded from lack of professional efficacy through cynicism to exhaustion; for turnover, the process proceeded from cynicism through lack of professional efficacy to exhaustion; and for job performance, the process proceeded from exhaustion through cynicism to lack of professional efficacy (Maslach & Leiter, 1988 model) (Swider & Zimmermann, 2010). Different burnout trajectories also investigate the process of burnout (Boersma & Lindblom, 2009; Häätinen et al., 2009; Maslach & Leiter, 2008) and give preliminary evidence of how the burnout process itself develops and provide a valuable contribution to research on the burnout process by including different outcomes and personality variables as antecedents to the models.

Taken together, all possible sequential development processes of burnout have been suggested, and empirical evidence has been found

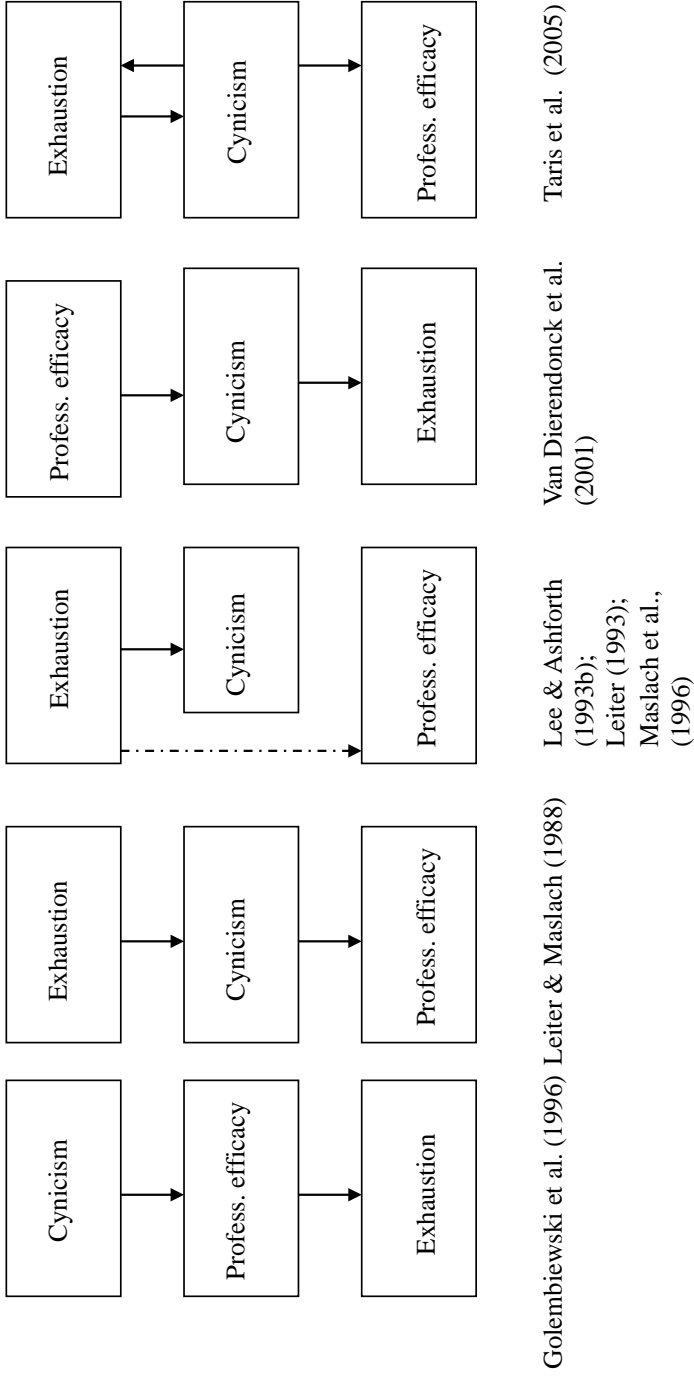


Figure 2. Different alternatives of sequential processes of development of burnout dimensions using the MBI-GS or the MBI-GS.

to support all of them. Exhaustion has been found to be the first sign of burnout in many studies, but it is not clear how the three dimensions relate to each other, because in most studies, the antecedents of burnout vary, if included at all. Despite a large field of studies, there is a lack of consensus on the causal relationships among the three dimensions of burnout, which may be partly due to the scarcity of longitudinal data.

1.4 Antecedents of burnout

Antecedents of burnout are usually divided into organizational, occupational, and individual (Maslach et al., 2001). Due to the interactive nature of burnout development, according to general stress theories, the characteristics in all of these domains have an effect on the relationship. It is surprising that although the interactive nature of the relationship between man and work means that there are also reversed causal or reciprocal relationships, these kinds of relationships have rarely been tested (Kalimo, 2005). As a matter of fact, it seems that although work characteristics are important determinants of burnout, their role in the development of burnout should be seen as reciprocal. The majority of the research results so far, however, are focusing on associations between antecedents of burnout and burnout dimensions. Most of the studies on antecedents of burnout have been cross-sectional, and it has been difficult to get significant results on predictors of burnout from longitudinal studies (Schaufeli & Enzmann, 1998).

Individual-level antecedents have been more seldom studied than antecedents of the other two domains (Swider & Zimmerman, 2010; Zellars, Perrewé & Hochwarter, 2000). There are a few reviews showing the relationship between personality and burnout (Alarcon, Eschleman & Bowling, 2009; Maslach et al., 2001; Schaufeli & Enzmann, 1998; Swider & Zimmerman, 2010). Some of the evidence regarding the importance of personal factors compared to occupational factors as predictors of burnout is contradictory (Hakanen, 2004; Kalimo et al., 2003). Despite the importance of individual characteristics in the process of burnout, they are not discussed here because they are not the focus of this thesis.

1.4.1 Occupational antecedents of burnout: theory and empirical evidence

By reviewing the waste amount of empirical studies where the relationship between work-related factors and burnout has been investigated (for reviews, see Lee & Ashforth, 1996; Maslach et al., 2001; Schaufeli & Enzmann, 1998), certain factors at work can be identified, which can be said to be more important to well-being than others, but work-related factors are typically also interrelated and form different combinations in different jobs. Several theories on important work characteristics have been applied in burnout research, the most important of which are the Job Strain Model (Karasek & Theorell, 1990), the Effort-Reward-Imbalance Theory (Siegrist, 1996), and the Social Exchange Theory of burnout (for a review, see Schaufeli, 2006). These theories all share the common basic assumption of the P-E Fit Theory (Edwards, 1996) that a misfit or an imbalance in an interaction between an individual and his/her job is the core or a starting point for disturbances in well-being, such as burnout (Härmä, Kompier & Vahtera, 2006). It has been shown that work characteristics have an effect on well-being rather than vice versa (ter Doest & de Jonge, 2006).

The Job Strain Model (Karasek & Theorell, 1990) has been widely applied to burnout research (e.g., Demerouti, Bakker, de Jonge, Janssen & Schaufeli, 2001a; Demerouti et al., 2001b). The conclusion of the empirical data coming from these studies suggests that demand factors at work are related to exhaustion, while lack of resource factors at work is related to cynicism (and lack of professional efficacy) (Bakker, Demerouti & Verbeke, 2004; Demerouti, Bakker, Nachreiner & Ebbinghaus, 2002; Demerouti et al., 2001b; Janssen, Schaufeli & Houkes, 1999; Lee & Ashforth, 1996; Leiter, 1991, 1993; Taris et al., 1999). There are also some implications that burnout syndrome is predicted by job strain, i.e., high job demands combined with low job control (Ahola & Hakanen, 2007; Ahola et al., 2005).

The basic idea of mismatch of the person and the work has been used as a starting point for defining six critical determinants of burnout (Leiter & Maslach, 1999; 2005a; 2005b; Maslach & Leiter, 1997). These six areas of mismatch at work, which are of crucial importance for the development of burnout, are: workload (quantitative or qualitative overload), control (e.g., role conflict, role ambiguity, and autonomy), reward

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(institutional, financial, or social), community (social support), fairness (fair and equitable work environment), and values (how individual and organizational values correspond). There can be a mismatch in any of these areas at work, and a program for banishing burnout is provided by recognizing the problems and guiding the solving of the problems (Leiter & Maslach; 2005b). Leiter and Maslach (2005a) provide support for their model on the antecedents of burnout by presenting results on the mediator role of burnout in predicting the effects of work characteristics on perceived change in the workplace.

Separate lines in the development of burnout symptoms are suggested by research results showing that burnout is a multicausal syndrome, in which different characteristics of work lead to the development of the different burnout components (Maslach & Jackson, 1984; Leiter, 1993). This hypothesis has been confirmed in many cross-sectional studies (see Schaufeli & Buunk, 1996; Schaufeli et al., 1993; Schaufeli & Enzmann, 1998, for reviews). Only some of these studies used the MBI-GS, but they show that work overload (Bakker, Demerouti & Euwema, 2005), poor management (Janssen et al., 1999; Leiter & Schaufeli, 1996), lack of social support (Lindblom, Linton, Fedeli & Bryngelsson, 2006), lack of support from co-workers (Janssen et al., 1999), lack of decision authority and lack of skill discretion (Taris et al., 1999), high demands (Lindblom et al., 2006), and emotional demands (Bakker et al., 2005) were related to burnout components.

In the longitudinal studies, the results concerning the work-related antecedents of burnout have been contradictory (see Schaufeli & Enzmann, 1998). There is some evidence that role problems (Lee & Ashforth, 1993b), lack of reward (Kalimo et al., 2003), and lack of social support (Jackson et al., 1986) are antecedents of burnout. In a study where the Copenhagen Burnout Indicator was used as a measure of burnout, it was found that low possibilities for development, high meaning of work, low predictability, high quality of leadership, low role clarity, and high role conflicts predicted burnout three years later (Borritz, Rugulies, Christensen, Villadsen & Kristensen, 2006). It has also been shown by an intervention study that changes in perceptions of job demands (workload) and job resources (job control, social support, and participation) were related to changes in emotional exhaustion and depersonalization during a one-year follow-up (Le Blanc et al., 2007).

Generally speaking, there is little empirical evidence on the longitudinal effects of work stressors on burnout (see Schaufeli & Enzmann, 1998). This does not mean, however, that there would be no effect, but that this effect has not been studied longitudinally, or that it is difficult to verify. The lack of evidence on the predictive effect of job stressors on burnout over time has also been explained by the stability of the burnout symptoms (Schaufeli & Enzmann, 1998; Taris et al., 2005). As burnout symptoms are closely related to job stressors, it has been difficult to establish longitudinal relationships in models where baseline burnout is controlled for (Borritz et al., 2005).

1.4.2 Societal background: white-collar and blue-collar occupations

It seems that the polarization of the Finnish workforce has continued, if not escalated, after the economic recession of the 1990s (Ylöstalo & Jukka, 2010). Differences in health are well-known between social economic status categories (see e.g. Borg & Kristensen, 2000; Siegrist & Marmot, 2004). It was found by the Health 2000 study that in the Finnish population there is a clear difference in health between those with high education and those with low education (Aromaa & Koskinen, 2002). It is also a common finding that blue-collar workers have more sickness absence spells than white-collar workers (Väänänen et al., 2003).

The stressful constellations of work instability and high effort can be most likely found in blue-collar workers (Godin & Kittel, 2004). Lack of control over one's job means lack of control over important resources, resulting in uncertainty and insecurity, which increase stress. Also disengagement has been associated with satiation and the experience of monotony, which are more often experienced in blue-collar jobs (Demerouti et al., 2002). About 30% of the blue-collar workers reported poor development possibilities in Finland (Kauppinen et al., 2007). The differences in the burnout measures between different occupational groups seem to suggest that the similar structure of burnout can be found across occupations, but that there are differences in the level of burnout scores (Demerouti et al., 2002).

Burnout has been more often studied in white-collar jobs, in which qualitative as well as quantitative work overload are assumed to lead to

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the development of exhaustion and other burnout symptoms. The possibility of 'passive burnout' has been raised by some authors (see Cox, Kuk & Leiter, 1993; Schaufeli & Enzmann 1998; Winnubst, 1993). This means that burnout might also develop in blue-collar occupations, where it is caused by a high degree of monotony combined with low control, while in white-collar jobs the stressors usually deal with role problems, interpersonal conflicts, and a heavy workload (Winnubst, 1993; see a similar categorization of jobs in Karasek & Theorell, 1990). Also an effort-reward imbalance or job strain resulting from demand-control imbalance is most likely to occur in low-skilled service and manual jobs, where the most adverse working conditions and most adverse work-related health outcomes can be found (Rydstedt, Devereux & Sverke, 2007). Blue-collar workers have traditionally had a greater exposure to risk factors, such as low paid, temporary, and insecure employment or shift-work. These insecurity factors were related to increased burnout levels in a Finnish population study (Kalimo, 2000). Although white-collar workers also face stressors at work (for instance, low job control, which has been found to be most detrimental to health), they are more common among blue-collar workers (Moncada, 1999; Siegrist & Marmot, 2004). Lower levels of burnout are expected in job positions that provide opportunities to experience challenge, control, and good social resources (Shirom & Melamed, 2005).

Thus, although the syndrome of burnout may be similar for different groups of people, the etiology of burnout may differ according to the organizational group, i.e., the stressors are different (Winnubst, 1993). It is probable that there are differences both in perceived job stressors and in goals and expectations regarding one's work between individuals, as well as between occupational groups and organizations (see Brown, 1996). So far, this has been a neglected area of research in the burnout literature.

Empirical evidence shows that burnout was also more prevalent in blue-collar jobs or in low socioeconomic status groups (Ahola et al., 2006a; Kalimo & Toppinen, 1997; Ahola et al., 2005; Norlund et al., 2010; Soares, Grossi & Sundin, 2007; this study used the SMBM measure of burnout), compared to the other groups of employees. Similar results were found by Hakanen (2004) and by using the Copenhagen Burnout Inventory found among Danish human service workers (Bor-

ritz et al., 2006). In a cohort study of Dutch employees, low education was related to burnout (Mohren et al., 2003). On the contrary, Maslach, Schaufeli and Leiter (2001) suggested, based on their experiences, that burnout is more prevalent among highly educated people. They speculate that this could be due to the higher responsibilities and higher stress, or higher expectations for their jobs which are not met (Maslach et al., 2001). The importance of occupation-level information was also shown in a study where occupational-level job control was inversely related to occupational-level burnout (Taris et al., 2006). Here, it is not occupation per se that is related to burnout, but occupations can generally be differentiated from each other on the basis of differences in the levels of working conditions (see also Lindblom et al., 2006).

Taken together, previous research illustrates the differences in health that exist between people in different socio-economic categories. Burnout has also been found to vary according to socio-economic position. However, the socio-economic view is largely neglected in burnout research, although it is known that the antecedents of burnout vary according to occupation. The general societal situation and the differences in the etiology of burnout across different groups should be taken into account to more fully understand the phenomenon.

1.5 Severe health and work ability consequences of burnout

1.5.1 Burnout as a phase in health deterioration

The whole longitudinal chain, from poor working conditions through (stress and) burnout to withdrawal behaviours, such as sickness absenteeism, and to physical illnesses or to chronic work disability, is largely empirically untested.

It is unclear what would be a suitable time frame for investigating the development of burnout syndrome or its health-related outcomes. Many studies use a one-year follow-up in investigating antecedents of burnout or the sequential development of burnout symptoms to avoid seasonal influences (e.g., de Lange, Taris, Kompier, Houtman & Bongers, 2004). The time frame of the study should reflect the true time lag between

the variables, but in most cases, it is either not known or not taken into account for practical reasons (de Lange et al., 2004). If a time lag is too short, the effects are usually underestimated, and if too long, it is possible that other factors confound the effect (Zapf, Dorman & Frese, 1996). The best alternative would be to use several measurements and/or an analysis method that takes time into account. In studies on health outcomes, a long time frame may be needed because the prevalence of diseases is small. Also, the possibility of the process being reciprocal rather than one-directional should be taken into account (de Lange et al., 2004), as it is conceivable that people who have health problems or burnout drift into jobs with low resources, and experience their work situation more negatively (de Lange, Taris, Kompier, Houtman & Bongers, 2005).

According to burnout theories, however, burnout is assumed to lead to poor health and physiological illness (Maslach et al., 1996). The effects of burnout may be physiologically mediated through impairment of the immunological system (Mohren et al., 2003) or changes in health behaviour (Melamed, Shirom, Berliner & Shapira, 2006a) such as alcohol consumption (Ahola et al., 2006c) or impaired sleep (Grossi, Perski, Evengård, Blomkvist & Orth-Gomér, 2003; Sonnenschein, 2007).

As a chronic stress syndrome, burnout may affect health physiologically by increasing allostatic load, which will then affect cognitive, autonomic, and neuroendocrine functioning. Allostasis refers to the active process by which the body responds to daily events and maintains homeostasis. Allostatic overload refers to a process where allostasis is chronically increased or dysregulated (McEwen, 2008). Allostatic overload represents a chronic “wear and tear” situation leading to physical impairment and possibly illness. However, the mechanisms underlying the relation between burnout and physical health are unclear. It has been difficult to establish a relationship between burnout and allostatic load (Langelaan, Bakker, Schaufeli, van Rhenen & Doornen, 2007). It is also possible that this process is reversed, so that chronic illness increases burnout (Ahola & Hakanen, 2007; Donders, Roskes & van der Gulden, 2007).

There is indirect evidence on the relationship between burnout and health. Physiologically, burnout has been shown to be associated with several cardiovascular risk factors, such as the metabolic syndrome, a change in levels of stress hormones, low-grade inflammation, impairment of the immune system, and blood coagulation and fibrinolysis (for

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a review, see Melamed et al., 2006a). Burnout has also been linked to several psychosocial antecedents of depressive disorders (Bonde, 2008; Netterström et al., 2008; Stansfeld & Candy, 2006), cardiovascular disorders (Belkic, Landsbergis, Schnall & Baker, 2004; Eller et al., 2009; Kivimäki et al., 2006), and musculoskeletal disorders (Jaworek Marek, Karwowski, Andrzejczak & Genaidy, 2010). Overall, burnout may be seen as a phase in the health deterioration process (Shirom, Melamed, Toker, Berliner & Shapira, 2005). This process is affected by individual life experiences and personality, but can also be influenced in another direction by positive experiences and favourable circumstances, such as social support (McEwen, 2008).

Burnout is typically related to concurring atypical physical distress symptoms (e.g., Schaufeli & Enzmann, 1998). These symptoms are numerous, and correlational studies provide only a little information on the health-related consequences of burnout. In the Finnish Health 2000 study, cross-sectional evidence on the relationship between burnout and clinically diagnosed ill health was found. In the general population, burnout was related to cardiovascular diseases among men and musculoskeletal disorders among women (Honkonen et al., 2006). It is noteworthy that the results from the same study showed that all three symptoms of burnout were relevant, not just the exhaustion component (Honkonen et al., 2006). Burnout was also associated with depression (Ahola et al., 2005), anxiety, and alcohol-related disorders (Ahola, 2006c). In the same study, burnout was associated with the risk of medically certified sickness absence independently of prevalent mental disorders and physical illnesses (Ahola et al., 2008).

The empirical evidence on the longitudinal association between burnout and diagnosed illness is much more scarce (Ahola, 2007; Maslach, 2001). Most of the studies on burnout have focused on organizational outcomes or different kinds of somatic or distress symptoms. Burnout was, however, prospectively associated with common infections in a Dutch working population (Mohren et al., 2003), with depression among Finnish dentists (Ahola & Hakanen, 2007; Hakanen, Schaufeli & Ahola, 2008), with type 2 diabetes, and with cardiovascular disorders (for a review, see Melamed et al., 2006b). In a previous study of a forest industry sample, it was even found to be related to future all-cause mortality among employees under 45 years of age at baseline (Ahola,

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Väänänen, Koskinen, Kouvonen & Shirom, 2010). An overview of the prospective studies is presented in Table 2.

Burnout is not clinically recognized according to the International Classification of Diseases (ICD-10; World Health Organization, 1992) or psychiatric classification systems, such as DSM-IV (American Psychiatric Association, 1994), and as such, does not justify sickness compensation or disability categorization in Finland. In Sweden, however, burnout has been a legitimate diagnosis (Andersson, 2006), and in the Netherlands, it justifies work disability benefits (Geurts, Kompier & Gründemann, 2000; Houtman, Desczca & Brenninkmeijer, 2006). Thus, also from a practical viewpoint, burnout can be assumed to be related to future illness and work disability.

Research still tackles the differential validity of the burnout concept, differentiating it from depression on the basis of its work-relatedness (Schaufeli & Enzmann, 1998; Shirom, 2005), or the different prevalence of both burnout and depression (Ahola et al., 2005), or personality differences between burnout and non-burnout individuals (Langelaan, Bakker, van Doornen & Schaufeli, 2006) related to the clinical applicability of burnout measures. Based on the first results of the Finnish population survey, it was suggested that depression is merely an outcome rather than a concomitant of burnout (Kalimo & Toppinen, 1997). This assumption was, however, not properly tested, and the mediating role of burnout (although frequently theorized) has gained relatively little attention. Recently, it was found that the cross-sectional results of the study were consistent with what one could expect if burnout would mediate between job strain and depressive symptoms and disorders (Ahola et al., 2006b). Ahola and others (2005) also found that, although burnout and depressive disorders were clearly related, they were not completely redundant. Major depressive disorders were especially related to an increased risk of burnout (Ahola et al., 2005). Other researchers have also shown that burnout and depression are not 'identical twins', as Brenninkmeijer and colleagues put it (Brenninkmeijer, Van Yperen & Buunk, 2001; Glass & McKnight, 1996; Glass, McKnight, Valdemarsdottir, 1993). In the Netherlands, the ICD-10 criteria for neurasthenia has been used as a diagnostic guideline for assessing burnout, and clinical validation of the MBI-GS has been based on this diagnosis (Roelofs et al., 2005; Schaufeli et al., 2001).

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Burnout not only develops gradually; recovery from severe burnout has also been found to be slow (Bernier, 1998; Sonnenschein, 2007). This means that people who suffer from burnout usually need long sickness absence leaves in order to recover, and some of them may never return to work. Because development of burnout takes time and is quite persistent, it has been difficult to show causal relationships between burnout and its outcomes in follow-up studies (Schaufeli & Enzmann, 1998). Most of the earlier studies on the outcomes of burnout did not focus on the health-related consequences of burnout, but on attitudinal variables and impaired organizational behaviour, such as job satisfaction, organizational commitment, or turnover intentions (see Iverson, Olekalns & Erwin, 1998; Maslach et al., 2001; Schaufeli & Enzmann, 1998; Taris, 2006).

The realization that sickness absences prescribed by a physician are indeed related to psychosocial factors at work has brought up the issue of developing work as one of the means to prevent sickness absenteeism and to reduce costs related to absenteeism (e.g., Väänänen et al., 2003; Väänänen et al., 2004a). The same applies to hospitalization due to various stress-related illnesses and work disability pensions. The results from a Finnish population study stress the importance of treating burnout by showing that a very small proportion of persons with severe burnout (2%) accounted for 22% of a new disability pension during a four-year follow-up (Ahola et al., 2009).

To sum up, although an increasing number of studies are focusing on the burnout-health relationships, not all of these studies use the three-dimensional conceptualization of burnout and make it clearly differentiated from fatigue or other forms of exhaustion. Furthermore, studies investigating the psychophysiological mechanisms behind burnout syndrome have provided inconsistent evidence so far (Sonnenschein, 2007). Finally, the time frame during which burnout develops as a syndrome and during which it affects physical and mental health remains unclear.

In the following, the consequences of burnout will be discussed in relation to the category of outcome in question: sickness absences, hospitalization, and work disability pensions. Previous research will be discussed on the relationship between burnout, and the three diagnostic categories: mental, musculoskeletal and cardiovascular disorders. The main focus will be on longitudinal studies, of which a summary will be presented in Table 2.

1.5.2 Hospitalization periods as severe health consequences of burnout

All hospitalization periods, their causes (diagnoses), and treatment can be investigated in Finland due to the national Hospital Discharge Register, which can be regarded as a reliable source of information on illnesses on a national level (Kajantie et al., 2006). Like records on longer sickness absence periods, the records of hospital admissions also contain information on diagnoses given by physicians. Hospital admissions can be regarded as a significant indicator of ill health, as many temporary or milder forms of illnesses are treated with sick leave or medication. Hospitalization can be seen as an indicator of ill health rather than work disability, as many people continue working and remain able to work after experiencing temporary hospitalization or chronic illness. In Finland, one-third of all working people report having a chronic illness or permanent disability diagnosed by a physician (Lehto & Sutela, 2008).

There are only a few studies investigating the effects of job stressors or perceived stress on hospitalization. Previous studies showed that perceived stress may be related to hospital admissions (Macleod et al., 2002; Rosengren et al., 2004). A recent study from a forest industry company found a decreased risk of future hospitalization for mental disorders due to high skill discretion, but an increased risk due to high decision authority (Joensuu et al., 2010).

There are only a few studies investigating the psychosocial causes of hospitalization and no previous studies investigating the relationship between burnout and future hospitalization.

1.5.3 Temporary and chronic work disability

Sickness absenteeism is perhaps the most common outcome in studies investigating the consequences of stress and burnout on health, although absence studies have neglected stress experiences at work as a cause of absence behaviour (Smulders & Nijhuis, 1999) and have focused mostly on psychosocial factors at work. There are some previous studies where self-reported sickness absences have been related with increased levels of burnout. In a study of nurses, burnout was associated with more sick leaves and more reported absences for mental reasons (Parker & Kulik,

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1995). Emotional exhaustion predicted the frequency of long absences (4 days or more) in hospitals (Firth & Britton, 1989) and absenteeism in the airline reservation service sector (in a computer-monitored work setting) (Saxton, Phillips & Blakeney, 1991).

There are only a few prospective studies on the predictive effect of burnout on future absences and among different occupational groups representing different working conditions and only a few studies investigating the whole range of diagnostic categories as outcomes of burnout (Ahola et al., 2008; Borritz et al., 2006; this study used the Copenhagen Burnout Inventory (CBI)).

Predictors of sickness absence due to psychosocial health complaints have been sought in order to find a screening instrument for sickness absences (Duijts, Kant, Landeweerd & Swaen, 2006). In this study, three MBI-GS items (from exhaustion and cynicism scales) predicted future sickness absences among working women but not among working men. Burnout scores could be used for early identification of employees at risk for future sickness absence. These results were based on self-reported data on sickness absences and their causes.

Burnout (as measured with the CBI) was prospectively associated with both self-reported sickness absence days and sickness absence spells in a Danish human service sector (Borritz et al., 2006). According to a meta-analysis (Duijts, Kant, Swaen, van den Brandt & Zeegers, 2007), the most consistent predictors of future sickness absences seem to be age and gender within socio-economic factors, psychosomatic complaints, medication use, burnout, and psychological problems within health and mental health factors, and low job control and low decision latitude within work-related factors. Screening for burned-out people would mean identifying people at risk for future sickness absences.

The sickness absences in Finnish working life have usually been studied by using self-report data. The number of sick-day episodes during the last few years shows a decreasing trend, but the number of sickness absence days is at the same time increasing (Ylöstalo, 2007). According to the same study, 17% of the employees over 55 years of age have doubts whether they can continue working after two years. About half of the working aged would like to work less or lighter.

Permanent work disability is a serious consequence of a disabling process preceded by illness or illnesses. The disability process is usually

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a long one, often related to an increasing duration of sickness absences and difficulties in returning to work following an illness (Dekkers-Sánchez, Hoving, Sluiter & Frings-Dresen, 2008; Virtanen, Vahtera & Pentti, 2007). The etiology of work disability is, however, related not only to illness but to various factors such as the occupational and social environment and lifestyle (Laine et al., 2009). Chronic stress is also important, as it has been found to be related to various illnesses, as well as psychosocial factors at work (Melamed et al., 2006a). In the process of increasing work disability, it may be seen as a phase of deteriorating health, i.e., successful prevention of burnout may also prevent work disability development.

The number of people receiving disability benefits has been continuously increasing (Stattin, 2005). In Finland, musculoskeletal, mental, nervous system, and cardiovascular disorders are the most common causes for work disability pensions. In 2008, there were altogether 260,000 people on disability pension in Finland (Finnish Centre for Pensions and Social Insurance Institution of Finland, 2010). Psychosocial factors have been found to be related to future work disability (Albertsen, Lund, Christensen, Kristensen & Villadsen, 2007; Krokstad, Johnsen & Westin, 2002; Laine et al., 2009; Vahtera et al., 2010). A Finnish population study found preliminary evidence on burnout, and especially exhaustion and cynicism subdimensions, as a predictor of disability pensions during a four-year follow-up (Ahola et al., 2009). In a Norwegian population-based study, feeling of being worn out increased the risk of future disability pensions because of back pain (Hagen, Tambus & Bjerkedal, 2002).

Overall, given the importance of disability pensions to society and to individual quality of life, there are surprisingly few studies on general causes for disability pensions (Allebeck & Mastekaasa, 2004). Besides the Finnish Health 2000 Study (Ahola et al., 2009), there are no other studies investigating the prospective effect of burnout on future work disability pensions and no diagnosis-specific studies that have used a continuous burnout variable as a predictor capturing the whole range of effects.

Table 2. Overview of significant results of previous longitudinal studies on health-related consequences of burnout, in chronological order.

Study	Study participants (response rate at follow-up)	Burnout measure, main result, and time frame	Adjusted factors: method and variables	Consequence or cause (disorder category and indicator)
Greenglass & Burke, 1990	N=361 (57%) employees from a school board in a large Canadian city (mostly teachers)	MBI. Exhaustion, cynicism, and lack of professional efficacy were related with future depression in a 1-year follow-up	-	Self-reported depressive symptoms
Appels & Schouten, 1991	N=3877 Dutch employees (64% blue-collar workers)	Single item (Have you ever been burned out?) was related to an increased risk of myocardial infarction in a 4-year follow-up	Medical examination: Coronary heart disease, age, blood pressure, smoking, cholesterol	Myocardial infarction (fatal or non-fatal); self-reported or register-based incidence verified by a physician
McKnight & Glass, 1995	N=100 (85% at time 1, attrition 20%) nurses	MBI. Exhaustion was related with depressive symptoms in a 2-year follow-up	Self-reported: Job control	Self-reported depressive symptoms
Bakker et al., 2003	N=214 (65%) Dutch nutrition production company	MBI-GS. Burnout (exhaustion and cynicism) predicted absence in a 1-year follow-up.	Self-reported: job demands, job resources, commitment, and absence frequency included in SEM models	Register-based absence duration; all causes
Mohren et al., 2003	N=12 140 (45%) Dutch working population sample	MBI-GS. Burnout predicted common infections duration in 6-month and 1-year follow-ups.	Self-reported: Age, gender, longstanding illness (yes/no). Excluded: infection at baseline	Self-reported common infections
Borritz et al., 2006	N=824 (75%) Danish human service workers	CBI. Burnout (work-related exhaustion) predicted sickness absence periods and their duration in a 3-year follow-up	Self-reported: Age, gender, organization, socioeconomic status, lifestyle factors, family status, having children under 7 years of age, and prevalence of diseases	Self-reported sickness absence frequency and duration; all causes

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Melamed, Shirom, Toker & Shapira, 2006b	N=677 (71%)	SMBM. Burnout (exhaustion) predicted type 2 diabetes in a 3-5-year follow-up.	Self-reported: Age, sex, body mass index, smoking, alcohol use, leisure time physical activity, initial job category, and follow-up duration	Self-reported type 2 diabetes (diagnosed and treated)
Ahola & Hakanen, 2007	N=2,555 (56%) Finnish dentists	MBI-GS. Burnout predicted depressive symptoms in a 3-year follow-up	Self-reported: depressive symptoms at baseline	Self-reported depressive symptoms
Ahola et al., 2009	N=3,125 (84%) Finnish population sample	MBI-GS. Burnout, and exhaustion and cynicism of its components predicted work disability pensions due to mental and musculoskeletal disorders, and all causes in a 4-year follow-up	Interview: age, gender, marital status, occupation, type of business, mental and physical disorders	Register-based work disability pension; all causes, mental and musculoskeletal disorders
Armon, 2009	N=3,235 (51%)	SMBM. Burnout (exhaustion) predicted insomnia in an 18-month follow-up.	Excluded: self-reported diagnosed CVD or diabetes, stroke or a mental crisis, antipsychotic or antidepressant medication use.	Self-reported insomnia
Grossi et al., 2009	N=2,300 (38%) women from Stockholm county	SMBM. Burnout (exhaustion) predicted self-reported overall pain, neck/shoulder pain, back pain, and disability in a 1-year follow-up.	Self-reported: depressive symptomatology, body mass index, age, gender, follow-up duration, and baseline levels of the criterion	Self-reported overall pain, neck/shoulder pain, back pain, and disability
			Self-reported SES and work characteristics, smoking, psychological distress, physical health, and basal pain parameters	

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Study	Study participants (response rate at follow-up)	Burnout measure, main results, and time frame	Adjusted factors: method and variables	Consequence or cause (disorder category and indicator)
Hätinen et al., 2009	N=85 (81%) participants of a discretionary medical rehabilitation	MBI-GS. Burnout predicted depression in a 6-month follow-up: due to the intervention, depression decreased among those in the low burnout group and among those in the high burnout - benefited group.	Self-reported: type of intervention, SES, total hours worked per week, years of work experience, previous illness, use of antidepressants, extra therapeutic counseling, respite from work	Self-reported depression
Melamed, 2009	N=650 (78%) Israeli employees from metal factories, pharmaceutical companies, textile factory, food factory, and school	SMBM. Burnout (exhaustion) predicted musculo-skeletal pain in a 3-5-year follow-up	Excluded: chronic illness or musculo-skeletal problems. Medical examination: age, gender, body mass index, smoking, leisure time physical activity engagement, occupation	Self-reported musculo-skeletal pain
Ahola et al., 2010	N=8,371 (63%) Finnish forest industry employees	MBI-GS. Burnout and exhaustion of its components predicted mortality in an 11-year follow-up among participants under 45 at baseline	Excluded: those who had been treated in a hospital for the most common causes of death prior to the assessment of burnout (register-based data). Registers: socioeconomic status, medication for mental health problems, cardiac risk factors, and pain problems	Register-based mortality; all causes, cardiovascular disorders

2. PRESENT STUDY

2.1 Theoretical framework

In this thesis, I followed the definition of burnout by Christina Maslach and her colleagues (Maslach et al., 1996). Therefore, the data of this thesis on burnout was collected by using the Maslach Burnout Inventory – General Survey (MBI-GS) (Maslach & Jackson, 1981; Maslach et al., 1996). The burnout theory used here also relies on this conceptualization and research results obtained using this measure. Thus, burnout is defined as a work-related phenomenon (Schaufeli & Taris, 2005) caused by a continuous mismatch between a person and his/her environment. Burnout is thought to develop in an interaction between work and the individual. The root causes of burnout are interpersonal, social, and organizational factors (Schaufeli, 2003). The syndrome of burnout as consisting of three dimensions: exhaustion, cynicism and lack of professional efficacy (Maslach et al., 1996) and their sequential development is assumed to proceed from exhaustion through cynicism to lack of professional efficacy (Leiter & Maslach, 1988). Furthermore, burnout is assumed to prospectively relate to several indicators of poor health and work ability, such as sickness absences, hospitalization periods, and work disability pensions (Maslach, 2001; Shirom, 2009).

There are several conclusive and thorough reviews and reports which have summarized the research results on antecedents of burnout, its sequential development alternatives, and outcomes (Cordes & Dougherty, 1993; Halbesleben & Buckley, 2004; Lee & Ashforth, 1996; Maslach et al., 2001; Melamed et al., 2006a; Schaufeli & Enzmann, 1998; Schaufeli et al., 1993; Shirom, 2003). The concept of burnout is investigated from different viewpoints as a process proceeding from its antecedents through

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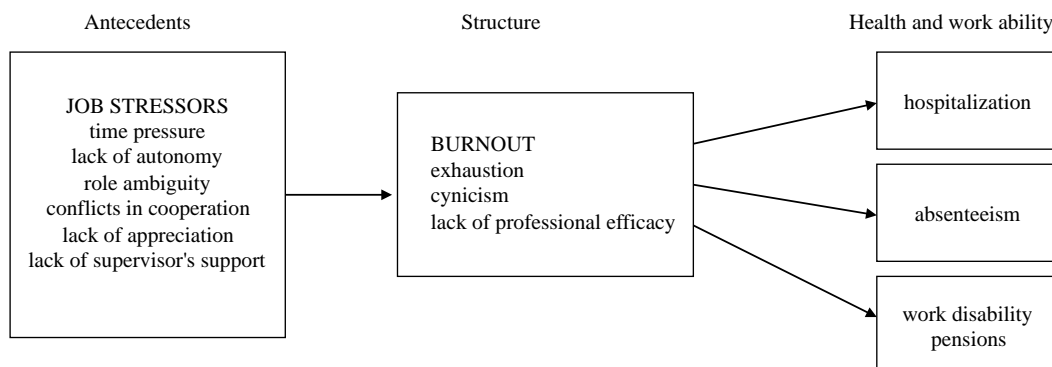


Figure 3. Hypothetical study model on the antecedents, structure, and consequences of burnout in the forest industry.

development of the syndrome to its outcomes. The hypothetical study model is presented in Figure 3.

2.2 The aims

The aim of the thesis was to investigate the concept of burnout as a process proceeding from its antecedents through syndrome development to its outcomes. Several work-related factors as antecedents of burnout were studied in different occupational groups. The syndrome of burnout as consisting of three dimensions: exhaustion, cynicism, and lack of professional efficacy (Maslach et al., 1996) and different alternatives for their sequential development were tested. Furthermore, several indicators of severe health and work disability outcomes of burnout were investigated in a longitudinal study design.

Specific study problems, the corresponding studies in the thesis (in parenthesis), and the corresponding hypothesis were as follows:

1. Is burnout, as measured with the Maslach Burnout Inventory – General Survey (MBI-GS), a three-dimensional construct, and how invariant is the factorial structure across occupations (Finnish) and nations (Finnish, Dutch, and Swedish) (I, II)? How persistent is exhaustion over a period of 8 years (II)?

2. PRESENT STUDY

Based on the Maslach theory on burnout (e.g., Maslach et al., 1996) and previous results on the factorial structure of the MBI, it was assumed that burnout consists of three interrelated dimensions, and this structure is not dependent on occupation or nationality, although there may be variation in the level of burnout between different subgroups. Exhaustion is expected to be persistent over time (Schaufeli & Enzmann, 1998).

2. What is the sequential process of burnout? Is it similar across occupations? How do work stressors relate to the process? (II)

Based on the Maslach theory on burnout as a process (e.g., Leiter & Maslach, 1988; Maslach et al., 1996), the process of burnout is assumed to proceed from exhaustion through cynicism to lack of professional efficacy, although lack of professional efficacy may also develop separately. Work stressors are expected to relate to burnout dimensions cross-sectionally and longitudinally in an 8-year follow-up (for a review, see Schaufeli & Enzmann, 1998).

3. How does burnout relate to severe health consequences and temporary and chronic work disability according to hospitalization periods (III; 10-year follow-up), sickness absence episodes (IV; 3-year follow-up), and new disability pensions (V; 8-year follow-up)?

Burnout is expected to predict severe health consequences and diminished work ability indicated by hospitalization periods, sickness absence episodes, and new disability pensions (e.g., Maslach, 2001; Shirom, 2009).

3. METHODS

3.1. Study procedure and subjects

The data of this thesis comes from a large research and development project in industry (Kalimo, Olkkonen & Toppinen, 1993; Kalimo et al., 2003; Kalimo & Toppinen, 1999; Toppinen-Tanner & Kalimo, 2003; Toppinen-Tanner, Kalimo & Jäppinen, 2000; Väänänen et al., 2003; 2004a; Väänänen, Pahkin, Kalimo & Buunk, 2004b; Väänänen et al., 2005; 2008). The study company is one of the biggest in the forest industry in Europe. Its headquarters are in Finland, where about 15,000 people were employed at the time of this study. The plants in Finland are dispersed around the country, and in many small towns, the company is still a very important and traditional employer with a long local history (Kalimo & Toppinen, 1999).

The company had started co-operation with the Finnish Institute of Occupational Health already in 1984 (see Kalimo & Toppinen, 1999). The first company-wide questionnaire survey was carried out in 1986. It was followed by targeted development actions in the following years and a survey questionnaire on the effects of these actions in 1988. The entire personnel were studied on a world-wide level in 1996, and a survey questionnaire was delivered to all employees. For Finnish employees, it included a personal consent form for collection of sickness absence data from the registers of the occupational health services of the company. This data was combined with the questionnaire survey data. The questionnaires were sent to work units and distributed by the company personnel. The responses were mailed confidentially in sealed envelopes directly to the investigators; it was also possible to take the sealed envelopes to a central point where they were then mailed together with other envelopes. The questionnaire was accompanied by a cover

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letter that explained the purpose of the study, emphasized voluntary participation, and guaranteed absolute confidentiality. In addition, for distribution of information on the study and its purpose, several channels were used, such as organizing information meetings where investigators from the FIOH and the company OHS management spoke, personnel magazines, and an intranet.

The data used in this study was collected between 1986 and 2005 (Figure 4). The basic population of the study consists of the entire domestic personnel of the company (N=15,466 in 1996). The company-wide questionnaire survey that was carried out in 1996–1997 (N=9705, response rate 63%) constitutes the main dataset of this study (Study group 1; Toppinen-Tanner et al., 2000). The respondents were divided into 6,025 blue-collar workers and 3,680 white-collar workers. The white-collar workers were further divided into four categories: (1) managers (N=1004), (2) supervisors (N=1393), (3) technical designers and laboratory personnel (N=294), and (4) clerks (N=989). The majority of the participants were men (N=7494) and the average age was 43.7 years. Most of the respondents had been working for the same company for more than ten years.

In addition, a sample of the entire personnel had responded to a survey questionnaire in 1988, which was combined with the 1996 data to form a panel data of 713 respondents (study group 2; Kalimo et al., 1993; Kalimo & Toppinen, 1999). The register-based data were collected between 1986 and 2005 from (1) the hospitalization records from the hospital discharge register (study group 3), the records of the Occupational Health Services of the company for a sample of respondents of the 1996 survey questionnaire (sickness absence data; study group 4), and (3) disability pension records of the Finnish Centre for pensions (study group 5). These data were combined with the 1996 questionnaire survey data with the help of a personal identification number which was saved with the study number by the researchers.

The data of this study thus came from two questionnaire surveys and three independent registers. They constitute longitudinal panel data on several thousand employees. The most important part of the data were collected with a questionnaire survey in 1996 in which nearly 10,000 people from all occupational groups of the company participated. The different phases of data collection and the study groups are presented in

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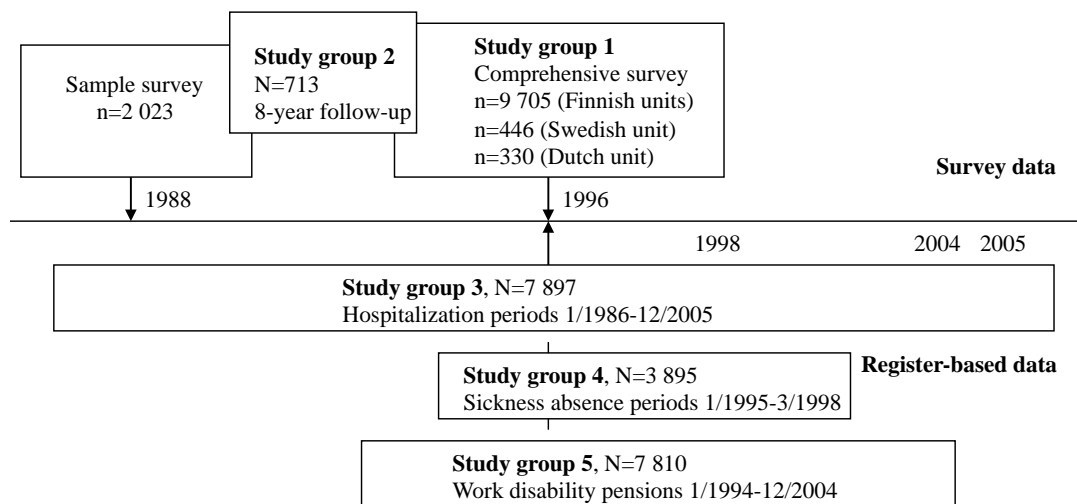


Figure 4. Collection of data.

Figure 4. The detailed descriptions of the five study groups and a table summarizing the descriptive characteristics of the separate studies (Table 3) are presented below.

3.1.1 Study group 1: respondents of the questionnaire survey in 1996

Of these respondents, the data on 9,607 people from Finnish units were available for Part I of the study. In addition, this data included participants from a Swedish unit (N=446) and a Dutch unit (N=330). After missing data on burnout items were deleted, a total of 9,055 (N=8529 Finnish, N=267 Swedish and N=259 Dutch) persons were analysed in Part I of the thesis. There were 3,378 white-collar employees and 5,677 blue-collar employees. The white-collar employees in the Finnish sample were further categorized according to their occupational status into the subgroups of top-level managers (N=859), supervisors (N=1242), technical designers and laboratory personnel (N=252), and clerks (N=877). Gender, age, and occupational group were variously distributed across subsamples. The Dutch sample was almost exclusively men and relatively

young (almost 70% were under 40), whereas relatively more women and older employees were included in the Finnish and Swedish samples (almost 70% of the Finnish respondents were over 40).

3.1.2 Study group 2: respondents of the questionnaire surveys in 1988 and in 1996

This longitudinal panel data was composed of two questionnaire survey datasets. A questionnaire survey had been carried out in 1988 for a sample of the total personnel of the company. The sample had been formed on the basis of occupational group (i.e., technical designers and supervisors) or specific factory units that had been targets for special development actions during the follow-up. The subjects for the 8-year follow-up study of exhaustion (and burnout) and job stressors were 713 persons who had been employed by the company throughout the follow-up period until 1996 and who had responded to both of these two questionnaire surveys. The 713 subjects were categorized into 415 white-collar employees and 298 blue-collar employees. Their mean age in 1996 was 49 years and 66% of them were men.

3.1.3 Study group 3: respondents of the questionnaire survey in 1996 who could be identified and linked to hospitalization records

Study group 3 was composed of all the domestic personnel who responded to the questionnaire survey in 1996 and who could be identified and linked to hospitalization records from the Hospital Discharge register between March 1996 and December 2005. Of the eligible domestic employees who responded to the questionnaire (N=9705), 8,371 could be identified from the database of the National Population Register Centre. Of this base population, 474 either did not produce a valid answer to the burnout inventory or had missing data on other relevant items. This reduced the final study population to 7,897, which was comprised of 6,029 male and 1,868 female employees. Of the sample, 62% were blue-collar employees. Female and white-collar employees were over-represented, and those aged 35–44 years were under-represented in the final sample.

3.1.4 Study group 4: respondents of the questionnaire survey in 1996 who gave their consent to link their absence records

The longitudinal data of study group 4 was composed of all respondents to the questionnaire survey working in domestic units in 1996 (N=9 075, 64% of the total personnel) who gave their personal written consent, agreeing to the extraction of their sickness absence records from the company registers (n=5 435, 56%). Information on 3,895 persons was available directly from the central computer register, because they had been working in units which, at the time of the data collection, were included in the central database. These persons (altogether 40% of the respondents of the questionnaire survey) are the subjects of this study. They were classified into two occupational categories: 1,707 white-collar employees and 2,188 blue-collar employees. The mean age of the participants was 44 years, and 76% of them were men. The sickness absence data was collected between January 1995 (1.5 year baseline) and March 1998 (1 year 9 months follow-up) and linked to questionnaire survey data (1996) by using personal identification codes.

3.1.5 Study group 5: respondents of the questionnaire survey in 1996 who could be identified and linked to pension records

The study population of study group 5 was composed of all the respondents to the questionnaire survey in 1996 (N=9705) who could be identified and linked to the register of the Finnish Centre for Pensions (N=8371). Of this base population, 71 had already been granted a pension, 490 did not produce a valid answer to the burnout inventory or had missing data on some other relevant items, reducing the final study population to 7,810 persons. Compared to the missing population, the final study population had more females (61% vs. 58%), more white-collar employees (75% vs. 51%), and fewer persons aged 35–44 years. Furthermore, they were granted a disability pension less often (6%) than those missing (12%). The 169 participants who died during the follow-up were excluded from the analyses, reducing the sample size to 7,641 employees.

Table 3. Descriptive characteristics of the studies I-V.

Characteristic	Study I	Study II	Study III	Study IV	Study V
Base population (n)	about 16,000	2023 at T1	15,466	15,466	15,466
Study population (n)	9,055	713	7,897	3,895	7,810
Participation (n)	10,383	713	9,705	9,705	9,705
Questionnaire (%)	65	35 (attrition not known)	63	63	63
Register (%)	-		54 (available from the registers)	25 (available from the registers)	50 (available from the registers)
Study design: Burnout in relation to	Socio-demographic factors: occupational group, national subsamples Factorial validity of burnout.	Job stressors (T1 and T2), Exhaustion (T1)	Hospitalization periods and their causes	Long (>3 days) sick leaves and their causes	New disability pensions and their causes
Burnout variable	Dimensional scores, as continuous.	Dimensional scores, as continuous.	Sum score and dimensional scores as continuous.	Sum score and dimensional scores, as trichotomized.	Sum score and dimensional scores, categorized into low, medium, and severe
Statistical analysis	Structural equation modelling, analysis of variance	Structural equation modelling	Cox hazard regression analysis	Poisson regression analysis	Cox hazard regression analysis, multinomial regression analysis
Results by occupational group	Yes	Yes	No	No	No

3.2 Measures

The data were collected with questionnaire surveys (burnout, job stressors, and some confounders) and from national registers (hospitalization records, sickness absence periods, disability pensions, and some confounders). A personal identification code was used to combine data from the questionnaire surveys with the three registers.

3.2.1 Burnout

Burnout was measured with the Finnish version of the Maslach Burnout General Survey (MBI-GS) (Maslach et al. 1996, Kalimo et al., 2006). The MBI-GS consists of 16 items measuring three components of burnout: exhaustion (5 items, $\alpha=0.86-0.90$), cynicism (4 items, $\alpha=0.81-0.83$), and lack of professional efficacy (reversed, 6 items, $\alpha=0.83-0.84$). Exhaustion refers to feelings of overstrain, tiredness, or fatigue resulting from overtaxing work. Cynicism reflects an indifferent attitude towards work, losing one's interest, and losing the meaning of work. It can be described as an employee's attempt to distance him/herself from work as a way of coping with overtaxing demands. Professional efficacy consists of feelings of competence, successful achievement, and accomplishment in one's work. One of the cynicism items was removed from this study because of its ambiguous formulation in Finnish, i.e., only four items were used. The internal consistency of the cynicism scale proved to be satisfactory after this exclusion ($\alpha=0.75$ with 5 items), and there were no problems in the other two dimensions to start with. All of the sum scores were re-scaled to the original response scale (0–6).

3.2.2 Antecedents

Antecedents of burnout were measured using five scales of job stressors. Most of the job stressor items were from the Occupational Stress Questionnaire (OSQ) (Elo, Leppänen & Lindström, 1992). The OSQ is a measure used to assess the perceived work environment and its effects. The reliability, the face validity, and the predictive validity of the OSQ have been found to be satisfactory in Finnish studies among a wide range of occupational groups (Elo et al., 1992; Elo, 1994; Kalimo et al., 1993;

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Kivimäki, Kalimo & Toppinen, 1998; Väänänen et al., 2003). The job stressors were scored on a 5-point frequency rating scale ranging from 1 (never) to 5 (always). The contents of the scales are reported below. The reliabilities (Cronbach's α) of the sum scales are also reported.

Time pressure was measured with one question concerning the feeling that one cannot achieve good enough quality in one's work within the allotted time. The sum scale on *Lack of autonomy* consisted of 5 reversed items on the ability to set one's own work pace, to leave one's working area without somebody taking over, to plan one's work, to carry out work freely, and to influence the objectives in one's work ($\alpha=0.79-0.81$). *Role ambiguity* was assessed by 5 questions covering such things as being aware of one's own task and of the entire work process, understanding how the work and responsibilities are divided in one's unit, and the possibility to plan and schedule one's own work ($\alpha=0.65-0.75$). *Conflicts in cooperation* was measured with four items on the quality of cooperation in one's work unit and between different work units, the help and support received from workmates, and how workmates get along in one's workplace ($\alpha=0.75-0.76$). *Lack of appreciation* was assessed by three items covering appreciation from one's superior and outside the workplace, and one's own evaluation of the importance and significance of one's work ($\alpha=0.68-0.72$). *Lack of supervisor's support* was measured with four items ($\alpha=0.80-0.82$) on the quality of the relationship between supervisor and employees, support from the supervisor, and whether the supervisor takes into account the opinions and the well-being of the employees.

3.2.3 Consequences

All hospitalization periods in Finland are collected into a national Finnish discharge register kept by the National Institute for Health and Welfare. It includes information on admission (date), discharge (date), and diagnosis and treatment for each case. Hospitalization records between 1996 and 2005 were collected from the Finnish discharge register. A baseline adjustment was made of all hospital admissions during the period before 1996, i.e., between March 1986 and February 1996. The diagnoses were recorded according to the International Statistical Classification of Diseases and Related Health Problems (ICD), versions 9 and 10 (World Health Organization, 1992). For this study, the diagnoses were

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categorized to indicate hospitalization due to mental and behavioural disorders (codes 290–319 and F00–F99), diseases of the circulatory system (codes 390–449 and I00–I99), and diseases of the musculoskeletal system (codes 710–739 and M00–M99). These categories were selected as they are the main causes of work disability in Finland (Finnish Centre for Pensions & Social Insurance Institution of Finland, 2010).

In the predictive models, subjects with a recent history of a disorder in the same disorder category according to the hospital admission register (1986–1996) or the registers of prescribed medication (1994–1996) were excluded from the analyses. Other confounding factors were age, gender, occupational status, and physical work environment. Additionally, the use of medication for hypertension or diabetes was adjusted for in models for cardiovascular disorders. Burnout and its dimensions were treated as continuous variables in the analyses.

The sickness absence episodes were extracted from the company's registers. These records included data on the beginning and end of every sick leave. In the check-out phase, all overlapping and consecutive spells of absence were combined. The number of sickness absence episodes was selected as the unit of analysis. The data also included the medical diagnosis for each sick leave certified by a physician. Short absences (1–3 days) of white-collar workers do not require a visit to a doctor, although the absence has to be reported and recorded. This means that information on the medical diagnosis category is reliable throughout the sample only for sick leaves lasting four days or longer.

The causes for absence were classified according to the International Statistical Classification of Diseases (ICD-10) (World Health Organization, 1992) into the following categories: (1) mental and behavioural disorders, (2) diseases of the circulatory system, (3) diseases of the respiratory system, (4) diseases of the musculoskeletal system (and connective tissue), (5) diseases of the nervous system, (6) diseases of the digestive system, (7) injury (injury, poisoning, and certain other consequences of external causes), (8) other causes, and (9) no specified diagnosis (which was given 30 times during the follow-up).

In the models age, gender, occupational status (blue- vs. white-collar work), and previous absence in the same disorder category were used as confounding factors.

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A **work disability pension** can be granted in Finland due to chronic illness, handicap, or injury that has resulted in decreased work ability (Gould, 2003). The information on new disability pensions (between 1996 and 2004) was collected from the national register of the Finnish Centre for Pensions. The causes were coded according to the International Statistical Classification of Diseases and Related Health Problems (ICD versions 9 and 10; World Health Organization, 1992) to indicate disability due to mental and behavioural disorders (codes 290–319 and F00–F99), diseases of the circulatory system (codes 390–449 and I00–I99), diseases of the musculoskeletal system (codes 710–739 and M00–M99), and other diseases or injuries (all other ICD codes), reflecting the main causes for work disability in Finland (Finnish Centre for Pensions and Social Insurance Institution of Finland, 2010). In the analysis, previous use of medication and self-reported health were controlled as confounders in addition to age, gender, marital status, and occupational group (blue vs. white-collar work).

3.2.4 Confounding factors

Information on *socioeconomic factors* was collected from a questionnaire survey or from National Population Register Centre on the respondents' basic characteristics, such as year of birth, gender, and occupational status. Occupational status was not adjusted for where the effect of occupational group was also under investigation. Furthermore, physical work environment hazards were adjusted for in the analysis of hospitalization periods. This information was obtained from the baseline questionnaire. Age, gender and occupational status were used as confounders in all analyses investigating the health and work ability outcomes of burnout. In addition, *previous health status* was adjusted for in these analyses. Regarding sickness absences, only previous absence (during 1.5 year before the questionnaire survey) in the same disorder category (ICD-10 diagnostic main categories) was controlled for. For hospitalization periods, recent history of the same disorder was evaluated using previous hospitalization periods in the same disorder category and prescribed disorder-specific medication as the basis for exclusion from the analyses. Furthermore, in the study of cardiovascular hospitalizations, potential biomedical risk factors were adjusted for. They were determined by using information

on whether a person had been eligible for reimbursement of medicine due to hypertension or diabetes. In the study of disability pensions, self-evaluated health status in addition to registered medication at baseline was used as a confounding factor.

3.3 Statistical analysis

The statistical analyses methods which were used in the thesis were structural equation modelling (LISREL) (Study I–II), Poisson regression modelling (Study IV), Cox proportional hazard regression modelling (Study III and V), and multinomial logistic regression modelling (Study V).

In Study I, the factorial validity of the Maslach Burnout Inventory – General Survey was investigated with a confirmatory factor analysis and some preliminary analyses (LISREL). The three-factorial structure of the burnout measure (i.e., burnout consists of three correlating factors: exhaustion, cynicism, and lack of professional efficacy) was tested against a single-factor solution (one factor comprising all three dimensions), 2 two-factor solutions (exhaustion and cynicism comprise a factor with lack of professional efficacy as the second factor either independent or correlating), another three-factor solution where lack of professional efficacy does not correlate with the other two, and a model where the three factors do not correlate. The fit of these models was tested in the total sample as well as in each national sample separately. The three-factor structure of the measure was further investigated in different employee groups.

In Study II, the development and process of burnout, and its antecedents were investigated with structural equation modelling (LISREL). The final model of the relationships between job stressors and burnout was selected as the starting point for comparing different subgroups. In these comparisons, the main focus was on whether there are differences between white-collar and blue-collar employees. The different possible intertemporal sequences of burnout dimensions were tested in three phases, including the effects of job stressors on burnout in all these models. Firstly, the three possible sequences of burnout development were tested in the 1996 data. Secondly, the persistence of exhaustion over 8 years and the predictive effect of exhaustion on cynicism and lack of professional efficacy were tested with the three possible intertemporal

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sequences between the burnout dimensions. Finally, the different alternative sequences with the predictive effect of exhaustion were tested in blue-collar and white-collar employees. A multiple group comparison method was used to compare the parameter estimates of the models between the two occupational groups in more detail.

In Study III, the risk of future hospitalization for mental, cardiovascular, and musculoskeletal disorders due to burnout, the Cox proportional hazard regression analyses were used (TPHREG procedure in the SAS 9.1). For each participant, follow-up person-days were calculated from the start of the follow-up period until death, hospitalization for a specific disorder category, or the end of the follow-up period, whichever came first. Adjusted hazard ratios (HR) and their confidence intervals (CI) were calculated to examine the relationship between burnout and hospitalizations. The persons who had been hospitalized for the same disorder or had used medication for the disorders before the follow-up were excluded from the analyses. Thus, the risk of future hospitalization due to burnout was analysed only among initially healthy participants. The associations were stepwise adjusted for age, gender, occupational status, physical work environment, and additional use of medication indicating health risk factors (only in cardio-vascular disorders).

Poisson regression analyses of the SAS statistical program were used in the predictive models of burnout and sickness absences **in Study IV** of the thesis. In the models, the relative risk of sickness absences in trichotomized burnout variables (low, medium, and high) was calculated using the low burnout group as the reference group. The effects of age, gender, and occupation were adjusted for in all models. In addition, previous absence in the same disorder category during 1.5 years before the burnout measurement was controlled. First, the number of sickness absence episodes from all causes was used as an outcome. Secondly, the effects of burnout syndrome and its dimensions on future sick leaves by diagnostic category were tested.

In Study V, the relative risk of disability pension due to burnout was analysed with Cox proportional hazard regression and multinomial logistic regression (SAS 9.1). To study the independent effect of burnout on disability, the analyses were then repeated among employees without registered medication and among employees without self-reported chronic illness at baseline. Then the association between continuous

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burnout variables and new cause-specific work disability was analysed with multinomial logistic regression. The analyses were adjusted stepwise for socio-demographic factors (age, gender, marital status, and occupational status), registered medication use, and self-reported chronic illness at baseline. Possible interaction effects between burnout variables and socio-demographic factors were tested by including interaction terms in the models.

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The results are presented according to the three main study questions. Firstly, the concept of burnout as a three-dimensional syndrome is investigated by studying the factorial validity of the MBI-GS across different occupations and nations (I). Secondly, the persistence and the sequential process of burnout and the antecedents of burnout according to occupational group will be presented (II). Thirdly, the results of the cause-specific health and work ability consequences of burnout in terms of hospitalization periods (III), sickness absences (IV), and work disability pensions (V) will be presented.

4.1 The structure of burnout syndrome (Study I)

The three-factor model of burnout was found to be superior to the other alternative models. The fit in the total sample of each of the less restrictive factor models was found to be superior to that of the null model, and each of the subsequent nested factor models showed an improved fit over the prior more restrictive models. The final three-factor model was slightly modified so that three pairs of error terms of items were allowed to correlate. All of these were correlations of error terms within the same subscale. The final re-specified model is presented in Figure 5.

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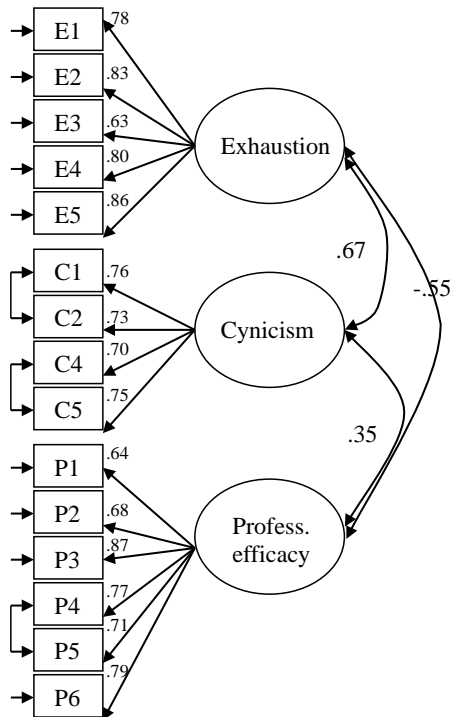


Figure 5. The re-specified SEM model of the three-factor structure of the MBI-GS across occupational groups and national samples (Finnish, Dutch, and Swedish) (N=9,055).

The three-factorial structure was found to be invariant in different subsamples (altogether 9,055 employees) representing different Finnish occupational groups (managers, foremen, technical designers, office and laboratory personnel, and workers) and different nationalities (Finnish, Dutch, and Swedish) (Table 4).

Differences in the mean levels of burnout components were found between occupational groups: the blue-collar employees reported higher levels of cynicism ($M=1.25$, $sd=1.58$ vs. $M=1.13$, $sd=1.44$; $F(1,9578)=41.67$, $p<0.001$) and lack of professional efficacy ($M=1.45$, $sd=1.80$ vs. $M=1.18$, $sd=1.46$; $F(1,9431)=140.89$, $p<0.001$) than the white-collar employees. There were also differences in the mean levels

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Table 4. The fit statistics of the SEM models of the three-factor structure of the MBI-GS across Finnish occupational groups and national samples (total Finnish, Dutch, and Swedish) (N=9,055).

Model	χ^2	d.f.	NFI	NNFI	CFI	AGFI	PNFI
Managers (N=859)							
M0	7779.35	105					
M3r	474.11	84	0.94	0.94	0.95	0.89	0.75
Supervisors (N=1242)							
M0	11966.20	105					
M3r	821.65	84	0.93	0.92	0.94	0.88	0.75
Technical designers (N=252)							
M0	2660.00	105					
M3r	274.21	81	0.90	0.90	0.92	0.81	0.69
Clerks (N=877)							
M0	9448.53	105					
M3r	612.00	84	0.94	0.93	0.94	0.75	0.75
Blue-collar workers (N=5294)							
M0	50517.63	105					
M3r	2528.67	84	0.95	0.94	0.95	0.91	0.76
Total Finland (N=8529)							
M0	81290.97	105					
M3r	4047.96	84	0.95	0.94	0.95	0.91	0.76
Sweden (N=267)							
M0	1879.07	105					
M3r	280.24	79	0.85	0.85	0.89	0.82	0.64
Netherlands (N=259)							
M0	1920.43	105					
M3r	270.38	81	0.86	0.86	0.90	0.83	0.66

M0=null model

M3r=respecified three-factor model

between the Finnish, Swedish, and Dutch populations after controlling for age, gender, and type of job. The Dutch respondents scored significantly lower on exhaustion and cynicism and lack of personal efficacy than the Swedish and Finnish respondents, i.e., they had lower levels of burnout symptoms than their Scandinavian colleagues.

4.2 The sequential process of burnout symptoms, persistence of exhaustion, and job stressors as antecedents of burnout (Study II)

The sequential development of burnout symptoms, the persistence of exhaustion, and the associated job stressors were studied in an 8-year follow-up of 713 white-collar and blue-collar employees.

First, in addition to a null model and a free covariation model, altogether three different alternative sequential processes were compared in the total sample at Time 2 according to previous theories and studies: (1) a sequence where cynicism leads to lack of professional efficacy and finally to exhaustion (exhaustion) (Golembiewski et al., 1996), (2) a sequence where exhaustion leads to cynicism and finally to a lack of professional efficacy (Leiter & Maslach, 1988), and (3) a model where a lack of professional efficacy influences cynicism which influences exhaustion (Van Dierendonck et al., 2001).

Since all three symptoms of burnout in this sample were included only in the second measurement, the intertemporal sequences of burnout dimensions were first tested only in the second measurement point. The three alternative paths and their fit indices, in addition to a null model and a free covariation model against which the alternative paths were tested, are reported in Table 5. The associations between job stressors (i.e., antecedents of burnout) were also included in these models.

The Time 1 and the Time 2 models where job stressors were associated with burnout dimensions were then combined to study in a longitudinal design (1) the persistence of exhaustion and the predictive effect of exhaustion on later cynicism and lack of professional efficacy, (2) the three alternative sequences of burnout dimensions, and (3) the longitudinal model among white-collar and blue-collar employees.

The results of the longitudinal structural equation models showed that exhaustion was persistent over time, but previous exhaustion did not predict any other symptoms of burnout eight years later. The sequential process best fitting the data was that from exhaustion through cynicism to lack of professional efficacy. The same result was obtained in both employee groups. However, in the white-collar workers, the coefficient

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Table 5. Comparison of the fit of four models presenting the alternative sequences between burnout symptoms in the total sample at Time 2 (SEM; N=713).

	χ^2	df	RMSEA	NNFI	GFI
A null model = no associations between the burnout symptoms	52.73	3	0.174	-0.42	0.97
A. Cynicism→Lack of PE→Exhaustion (Golembiewski et al., 1996)	61.93	3	0.189	-0.68	0.96
B. Exhaustion→Cynicism→Lack of PE (Leiter & Maslach, 1988)	1.02	3	0.000	1.01	1.00
C. Lack of PE→Cynicism→Exhaustion (van Dierendonck et al., 2000)	7.87	3	0.054	0.98	1.00
Free model = free covariation between the burnout symptoms	7.60	2	0.071	0.76	1.00

between cynicism and lack of professional efficacy was not significant in the final model (Figure 6).

Several job stressors were included in the model in order to study their relationships with burnout among white-collar and blue-collar employees. The investigated job stressors were time pressure, lack of autonomy, role ambiguity, conflicts in cooperation, lack of supervisor's support, and lack of appreciation. In white-collar workers, time pressure and conflicts in cooperation were associated with exhaustion at both times. Lack of appreciation was related to all dimensions of burnout, and role ambiguity to cynicism and lack of professional efficacy at Time 2. Among the blue-collar workers, lack of appreciation was related to all burnout dimensions and also exhaustion at Time 1. Conflicts in cooperation were associated with exhaustion at both times, and cynicism at Time 2. Role ambiguity was related to cynicism and lack of professional efficacy. Lack of autonomy and lack of supervisor's support were not related to any burnout dimension in the models. Of these associations, exhaustion was more strongly associated with time pressure in the white-collar jobs than in the blue-collar jobs, and conflicts in cooperation were more strongly associated with exhaustion and cynicism in the blue-collar jobs

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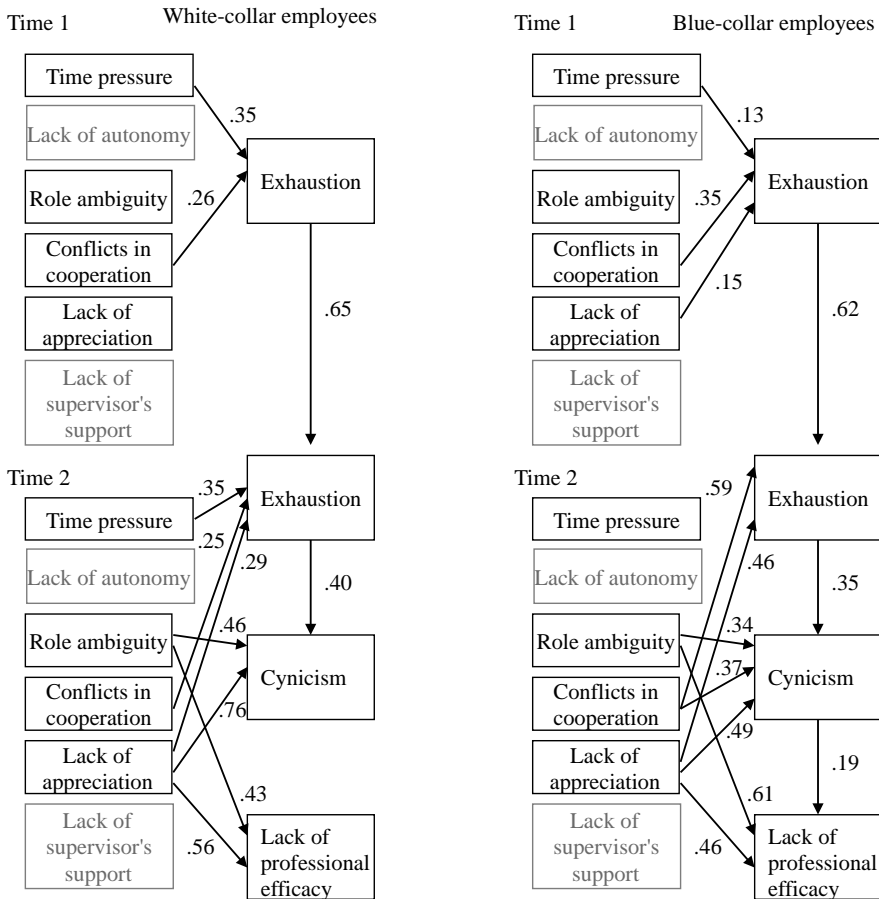


Figure 6. Lisrel estimates for the structural effects in the final model of the white-collar and blue-collar employees (in the total sample χ^2 with 54 df was 71.59, $p=0.055$, RMSEA=0.035, NNFI=0.96, GFI=0.99). The intercorrelations between the job stressors are not depicted for reasons of clarity. All effects are significant ($p<0.05$).

than in the white-collar jobs. Modification indices of the model gave no indication of other significant relations, that is, longitudinal relationships between job stressors and burnout dimensions.

4.3 Summary: development of burnout syndrome among white-collar and blue-collar employees

The results from this study showed that the three-dimensional structure of burnout as measured with the Maslach Burnout Inventory – General Survey fit the data well. The factor structure was invariant across employee groups and three nations. There were differences in the level of burnout across employee groups, showing that cynicism and lack of professional efficacy were more common among blue-collar employees.

The data supported a model where burnout sequentially develops from exhaustion through cynicism to lack of professional efficacy, but these results are only cross-sectional. The process seemed to proceed in a similar manner among the white-collar and the blue-collar employees. Exhaustion persisted over eight years, but did not predict cynicism or lack of professional efficacy eight years later. Time pressure, role ambiguity, conflicts in cooperation, and lack of appreciation were associated with burnout dimensions, but also these associations were cross-sectional and not longitudinal. Time pressure seemed to be a stronger predictor of burnout among white-collar workers, whereas conflicts in cooperation played a bigger role in burnout development among blue-collar employees. Overall, lack of appreciation was an important predictor of different burnout dimensions.

4.4 Ill health and work disability as outcomes of burnout (Studies III–V)

4.4.1 Hospitalization (Study III)

During the follow-up of 9 years and 10 months, there were 3,421 hospital admissions among 7,897 subjects. The most common diagnostic categories as causes for hospital admissions (besides the category of all other disorders, N=1,790) were musculoskeletal disorders (N=829), cardiovascular disorders (N=649), and mental disorders (N=153). Of the confounding factors, hospital admissions were related to old age, male gender (cardiovascular disorders), and physical environment (musculoskeletal disorders).

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Burnout syndrome was related to future hospital admissions due to mental and cardiovascular disorders among initially healthy subjects (i.e., persons with a previous history of the same disorder or use of medication for that disorder were excluded) (Table 6). Of the separate dimensions, exhaustion and cynicism were also related to future hospitalization due to the same disorder categories, and cynicism was associated with future musculoskeletal disorders.

Table 6. The effect of burnout on future hospitalization in three diagnostic categories among employees with no previous cause-specific hospitalization periods or use of medication at baseline (adjusted for age, gender, occupational group, and physical environment); adjusted hazard ratios (HR) and their 95% Confidence Intervals (95% CIs).

	Reason for hospitalization		
	Mental disorders	Cardiovascular disorders *	Musculoskeletal disorders
	HR (95% CI)	HR (95% CI)	HR (95% CI)
Burnout syndrome	1.37 (1.18–1.58)	1.10 (1.02–1.19)	1.05 (0.98–1.13)
Exhaustion	1.38 (1.20–1.58)	1.09 (1.02–1.18)	1.03 (0.96–1.10)
Cynicism	1.37 (1.18–1.57)	1.12 (1.04–1.20)	1.07 (1.00–1.14)
Lack of prof. effic.	1.03 (0.88–1.20)	1.01 (0.93–1.08)	1.02 (0.96–1.09)

* Additionally adjusted for use of medication for hypertension or diabetes at baseline.

4.4.2 Diagnosed sickness absences (Study IV)

The most prevalent diagnostic categories as causes of sickness absences were musculoskeletal disorders (1,232 absence episodes in 686 persons; M=18.07, SD=50.66 episodes per 100 person years) and respiratory disorders (671 absence episodes in 534 persons; M=9.84, SD=27.43 episodes per 100 person-years). The prevalence of mental disorders was 107 episodes in 82 persons, and the mean of sick-leave absence episodes according to mental disorders per 100 person years was 1.97 (SD=16.16). The prevalence of absence episodes due to cardiovascular disorders was 107 episodes in 82 persons (M=1.57, SD=12.22 per 100 person years).

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The number of sickness episodes, the total number of sick-leave days per person, and the episodes according to most of the different diagnostic categories were associated with the total burnout score and with the separate dimensions of burnout (Table 7). Total burnout score and exhaustion of the dimensions of burnout were significant predictors of future sick leave episodes. The risk for future sick leave in the high burnout group was 1.08 (95% CI 1.01–1.15), and in the high exhaustion group it was 1.09 (95% CI 1.02–1.16).

Burnout syndrome was related to future absence episodes in the following diagnostic categories: mental disorders, cardiovascular disorders, respiratory disorders, and musculoskeletal disorders. In addition,

Table 7. The effect of burnout on future sickness absence episodes in three diagnostic categories. Univariate overdispersed Poisson regression models (adjusted for age, gender, employee group, and baseline absence in the same disorder category); risk ratios (RR) and 95% confidence intervals (95% CI).

	Reason for sickness absence		
	Mental disorders	Cardiovascular disorders	Musculoskeletal disorders
	RR (95% CI)	RR (95% CI)	RR (95% CI)
Burnout (total)			
High	3.15 (1.38–7.19)	1.89 (1.00–3.60)	1.26 (1.04–1.52)
Medium	2.17 (0.92–5.16)	1.67 (0.86–3.25)	1.05 (0.86–1.29)
Low	1	1	1
Exhaustion			
High	3.61 (1.58–7.01)	2.58 (1.43–4.65)	1.35 (1.13–1.63)
Medium	1.83 (0.81–4.13)	1.62 (0.85–3.09)	1.17 (0.97–1.43)
Low	1	1	1
Cynicism			
High	2.44 (1.08–5.51)	0.88 (0.47–1.63)	1.24 (1.01–1.52)
Medium	1.97 (0.86–4.48)	1.38 (0.78–2.45)	1.17 (0.95–1.43)
Low	1	1	1
Lack of prof. effic.			
High	2.22 (1.14–4.34)	0.89 (0.51–1.54)	1.28 (1.07–1.53)
Medium	1.63 (0.78–3.40)	0.63 (0.33–1.21)	1.12 (0.92–1.37)
Low	1	1	1

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exhaustion was associated with increased future risk of mental disorders, musculoskeletal disorders, cardiovascular disorders, and other causes. Cynicism was related to mental disorders, musculoskeletal disorders, and digestive disorders. Finally, lack of professional efficacy was predictive of future risk of mental disorders and musculoskeletal disorders. In Table 6, the results for mental, cardiovascular, and musculoskeletal disorders are presented in more detail.

4.4.3 Work disability pensions (Study V)

During the follow-up of 8 years and 10 months, 507 participants (among 7641 subjects) were granted a disability pension. The hazard ratio for a new disability pension during the follow-up was 3.82 (95% CI 2.69–5.43) among those with severe burnout and 3.16 (95% CI 2.47–4.04) among those with severe exhaustion. In the fully adjusted model, the corresponding hazard ratios were 1.57 (95% CI 1.09–2.26) for burnout and 1.64 (95% CI 1.27–2.13) for exhaustion. Crude associations between burnout and all categories of cause-specific disability were significant, but only exhaustion predicted mental and miscellaneous disorders after all adjustments.

In the models where self-reported chronic illness was not adjusted, several other significant relationships remained between burnout and its subdimensions exhaustion and cynicism and mental and musculoskeletal disorders (Table 8). Lack of professional efficacy was not related to future work disability according to any disorder category. However, in women, severe lack of professional efficacy predicted future work disability pensions (HR 1.68, 95% CI 1.00–2.82).

Table 8. Hazard ratios (OR) and their 95% confidence intervals (95% CIs) for cause-specific disability pensions during 1996–2004 in relation to burnout and its subdimensions (N=7,641).

	Reason for disability pension					
	Mental disorders		Cardiovascular disorders		Musculoskeletal disorders	
	I	II	I	II	I	II
Burnout (total)	1.37 (1.12–1.69)	1.21 (0.97–1.50)	1.14 (0.91–1.44)	1.03 (0.81–1.31)	1.27 (1.10–1.46)	1.06 (0.91–1.22)
Exhaustion	1.36 (1.17–1.58)	1.23 (1.05–1.44)	1.08 (0.90–1.28)	0.98 (0.81–1.18)	1.23 (1.11–1.37)	1.06 (0.95–1.19)
Cynicism	1.12 (0.95–1.32)	1.05 (0.89–1.24)	1.17 (0.99–1.39)	1.12 (0.94–1.33)	1.20 (1.08–1.34)	1.10 (0.99–1.23)
Lack of prof. effic.	1.07 (0.92–1.26)	1.03 (0.88–1.21)	0.99 (0.84–1.18)	0.97 (0.82–1.15)	0.99 (0.89–1.10)	0.93 (0.84–1.04)

I Model adjusted for age, gender, marital and occupational status, and registered medication use.

II Model adjusted for age, gender, marital and occupational status, and registered medication use and self-reported chronic illness.

4.5 Summary: Consequences of burnout for health and work ability

In longitudinal study design, burnout was related to future severe negative health consequences indicated by hospitalization, medically certified sickness absences, and disability pensions. Of the separate disorder categories, burnout was most consistently related to mental, cardiovascular, and musculoskeletal diagnosed causes of illnesses or work disability. Exhaustion and cynicism of its dimensions were predictive of future ill health and work disability, while lack of professional efficacy was related only to future sickness absences.

5. DISCUSSION

5.1 Summary of the main findings

This thesis investigated the entire process of burnout from its antecedents through sequential development of burnout dimensions to its health-related consequences.

First, the concept of burnout as a three-dimensional construct was investigated. The factorial structure of the MBI-GS as a three-dimensional construct was found to best fit the data and to be invariant across occupational groups and three different national samples. On the basis of these results, burnout can be regarded as a syndrome consisting of three separate but correlating symptoms of exhaustion, cynicism, and lack of professional efficacy supporting the hypotheses.

In the second part of the thesis, the sequential development of the burnout dimensions was investigated. As a syndrome, burnout was strongly related to job stressors at work, and in a cross-sectional design, it seemed to develop from exhaustion through cynicism to lack of professional efficacy. These results partially support the hypothesis on the order of the dimensions on the development of the syndrome, as well as the work-relatedness of the syndrome. As a process consisting of a work situation, it proceeded in a similar manner among white-collar and blue-collar employees. But as there were differences in job stressors between the two occupational groups, there were also differences in how strongly the job stressors were related to burnout dimensions between the two groups. Time pressure was more often associated with exhaustion in white-collar workers, whereas conflicts in cooperation seemed to play a bigger role in exhaustion and cynicism among blue-collar workers. Furthermore, although the process seemed to proceed in a similar manner in both groups, in the final model, only lack of professional efficacy

of white-collar workers was associated with job stressors; the other two components were not. It was also shown by the results that exhaustion persisted even after eight years of follow-up, but it did not predict cynicism or lack of professional efficacy eight years later. Nor were job stressors related to burnout in a longitudinal design, but only cross-sectionally. Thus, no support for hypothesized longitudinal relationships between job stressors and burnout were found.

Besides the persistence of exhaustion and antecedents of burnout, longitudinal results were obtained from the health-related consequences of burnout. The investigated outcomes represented different phases of health deterioration from sickness absences and hospitalization periods to work disability pensions. The results were in line with the hypotheses showing that burnout syndrome, and exhaustion and cynicism of its components, were related to future hospitalization for mental and cardiovascular disorders. Burnout was also related to a number of future sickness absence periods lasting 4 days or more and prescribed by a physician. Among the diagnostic categories, it was related to absences due to mental, cardiovascular, and musculoskeletal disorders. Of the separate dimensions, exhaustion was related to the same three disorder categories, cynicism was related to mental, musculoskeletal, and digestive disorders, and lack of professional efficacy was related to mental and musculoskeletal disorders. Future disability pensions were predicted by exhaustion in fully adjusted models (age, gender, marital and occupational status, and registered medication use and self-reported chronic illness were adjusted).

5.2 Burnout concept – three dimensions and one syndrome?

The three-dimensional definition of burnout has been a much discussed and controversial issue in burnout research (e.g. Schaufeli & Enzmann, 1998; Schaufeli et al., 2009). According to Maslach and her colleagues, burnout has been defined as a three-dimensional syndrome (Maslach, 2003; Maslach, 1993; Maslach et al., 1996; Maslach & Leiter, 2008), and The Maslach Burnout Inventory has become the “golden standard” of measuring burnout, although new instruments have also been introduced (Cox et al., 2005).

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It is possible that the syndrome is more than the sum of its parts. Like in many syndrome descriptions, no individual symptom is sufficient to represent a syndrome. Individual symptoms alone might mean something different; for example, cynicism might mean a negative attitude towards work with no connection to exhaustion. The results of this thesis support the three-dimensional syndrome quality of burnout because the fit of the correlating three-factor model of the relationships between the three burnout dimensions was superior to all other possible models.

First, the factorial structure of burnout as a three-dimensional construct by using the MBI-GS was confirmed in different occupational groups and in different nations. This result is in line with many other studies using the same measure of burnout (Bakker et al., 2002; Demerouti et al., 2001b; Kalimo & Toppinen, 1997; Kitaoka-Higashiguchi et al., 2004; Hallberg, 2005; Langballe et al., 2006; Leiter & Schaufeli, 1996; Schreurs & Taris, 1998; Taris et al., 1999). The basic strength of the multidimensional concept of burnout is its many-sidedness, as it reflects not only energetic processes but also attitudinal and motivational processes which are important in the working life context (Leiter, 1993). In most of the previous analyses, the best possible alternative for the structure of burnout has been the oblique three-factor model or a model where at least exhaustion and cynicism correlate with each other. Although the professional efficacy component seems to be somewhat different and is not necessarily found to correlate very strongly with the other two, previous findings may reflect a statistical artefact and it is too early to leave it out from the phenomenon (Halbesleben & Buckley, 2004; Schaufeli & Taris, 2005). The factorial validity of a construct is not, however, sufficient to show that it is a reliable and conceptually and theoretically valid concept which can be differentiated from other similar concepts. Therefore, investigating other theoretically relevant concepts in relation to the burnout process is necessary to study its validity.

Second, the structural equation models with all burnout components combined with several job stressors supported the three-dimensional construct of burnout. In the preliminary analysis where cross-sectional models were evaluated, it was shown that a sequential model including all the three dimensions best fit the data. The same structure between burnout dimensions was further confirmed in a partially longitudinal model. There are previous studies showing that exhaustion and cynicism

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components are closer together and the role of professional efficacy remains unclear (Leiter, 1993; Maslach et al., 2001; Schaufeli & Enzmann, 1998; Schaufeli & Taris, 2005). Also the results from this study showed that with white-collar employees, the professional efficacy dimension was no longer directly related to cynicism or exhaustion, but remained significant through its shared relations with job stressors. This is in line with the process theory of Leiter (1993), where lack of professional efficacy develops separately in close connection with organizational stressors. It has been concluded that severe burnout most likely includes high scores on several dimensions compared to one dimension only (Boersma & Lindblom, 2009; Häätinen, 2008).

Third, the health-related consequences of burnout in this study were related especially to the separate dimensions of exhaustion and cynicism, but also to lack of professional efficacy and to burnout syndrome. A severe lack of professional efficacy was related to future sickness absences due to mental and musculoskeletal disorders. The finding that burnout syndrome (consisting of the three dimensions) was in most cases also related to future health further supports the three-dimensional definition of the burnout concept and the use of the total score of burnout. Burnout syndrome has also been earlier found to be associated with physical illness and to predict common infections even more strongly than exhaustion only (Honkonen et al., 2006; Mohren et al., 2003).

The syndrome nature of burnout (i.e., consisting of three interrelated symptoms) seems to emerge also from studies investigating personal profiles of burnout (Boersma & Lindblom, 2009; Demerouti et al., 2005). That is, a high score in all three dimensions reflects burnout cases. It seems that both variable-based and person-based approaches to burnout and its antecedents come to similar conclusions. The person-oriented approaches on a general level have found cases of burnout, no burnout, and categories of one symptom only (Boersma & Lindblom, 2009; Häätinen et al., 2004; Maslach & Leiter, 2008), which corresponds to studying the total burnout score and the three dimensions separately. It can be argued that the use of the total burnout score and the three dimension scores seems justified.

The categorization of no burnout, medium burnout, and severe burnout according to the total burnout score may be useful in some situations where burnout cases need to be identified or the prevalence of burnout

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reported. We have previously provided guidelines for calculating the total score and determining the no burnout, medium burnout, and severe burnout cases based on frequency of symptoms (Kalimo & Toppinen, 1997; Kalimo et al., 2003; Kalimo et al., 2006). As the cut-off scores have been determined on the basis of an actual response scale on the frequency of perceived symptoms, it is a very practical tool for evaluating burnout symptoms on an individual and a group level. Determined in this way, they are not dependent on the reference sample distribution. It has previously been found in a cross-sectional and longitudinal design that work and individual characteristics differentiated between high burnout and low burnout groups, which were categorized by using these cut-off scores (Kalimo et al., 2003). In this thesis, the categorization was used only in the study where disability pensions were predicted by burnout (Study V). Also another way to categorize levels of burnout was used in Study III of the thesis, where the burnout scores were trichotomized into no burnout, medium burnout, and severe burnout levels according to the sample distribution. In two other studies (Study IV and V), continuous burnout variables were used to determine the risk of future hospitalization and disability pension. Some researchers have used a medium split of variables to categorize people into low vs. high burnout groups (Boersma & Lindblom, 2009; Golembiewski et al., 1996; Maslach & Leiter, 2008). This has been done to formulate the development paths or phases of burnout and how people move from one phase to another. It may be arbitrary to classify people into two categories determined by a group median, and moving from one category to another may be arbitrary as well. From a statistical point of view, using burnout scores as continuous variables is a good option because the continuous score best represents the actual data.

Taken together, the results of this thesis support the three-dimensional definition of burnout and the use of the MBI-GS. The multifaceted nature of the burnout syndrome does not imply that the overall concept of burnout should be abandoned. The total burnout score (Kalimo & Toppinen, 1997; Kalimo et al., 2003; Kalimo et al., 2006) seems to be a valid alternative to operationalize burnout syndrome. The results of this thesis seem to imply that burnout syndrome may be something other than just the sum of its parts, but results on the three separate dimensions need not be left out because they can all be calculated from the same burnout scale. The results from previous studies using the total score of burnout

also seem to support the syndrome nature of burnout by showing that the total score is strongly related to theoretically important antecedents and consequences of burnout.

5.3 Sequential development of burnout dimensions

The sequential development of burnout symptoms is important for identifying the first stages of burnout and targets for prevention. Five possible sequences for the development of the three burnout dimensions have been suggested (for a review, see Taris et al., 2005), and four of these were tested in this thesis.

The sequence presented by Maslach & Leiter (1988) was found to fit the cross-sectional study data the best. In this model, exhaustion is the first symptom, where people feel overextended and unable to unwind and recover, lacking energy to face another day or another task or person. Exhaustion is followed by cynicism as an attempt to protect oneself from exhaustion and disappointment. Being so negative can seriously damage not only well-being but the capacity to work effectively. Thus, lack of professional efficacy will be caused by experienced inefficacy in accomplishing and achieving goals. As a response, lack of professional efficacy is also directed towards oneself so that it comes close to decreasing self-esteem. This is one of the processes that may also lead to depressive symptoms (Kalimo & Toppinen, 1997). The ability to compare different kinds of occupations in the process of burnout and finding similarities among them implies that generic developmental paths within the syndrome may be found.

The sequential process starting from exhaustion has been found by many researchers. Most recent evidence using 2-wave longitudinal data supported a model where exhaustion predicted depersonalization over time, and depersonalization was associated with future high exhaustion and lower levels of personal accomplishment (Diestel & Schmidt, 2010; Taris et al., 2005). The importance of exhaustion as the core of burnout is widely acknowledged (for reviews, see Schaufeli & Enzmann, 1998; Shirom, 2005). It has also been shown that exhaustion is most substantially associated with burnout, as indicated by work-related neurasthenia (Roelofs et al., 2005). Based on its central role in burnout and in the

process of burnout, the exhaustion scale may be particularly useful in screening for burnout. Intervention studies have also shown that out of the three burnout dimensions, it is the easiest to change (for reviews see Lamontagne et al., 2007; Le Blanc et al., 2007; Marine, Ruotsalainen, Serra & Verbeek, 2006; Seymor & Grove, 2005; van der Klink, Blonk, Schene & van Dijk, 2001).

If we take it for granted that burnout is a multidimensional phenomenon, an understanding of the underlying developmental process is necessary for designing adequate interventions (van Dierendonck et al., 2001). This means identifying risk groups of burnout development, preventing burnout focusing on relevant work-related characteristics and personal resources, and treating burnout in its more advanced phases.

5.4 Job stressors and the importance of occupation

The differences in working conditions and health between different socio-economic groups are well-known. Typically, blue-collar occupations entail a more hazardous working environment, and blue-collar employees have more sickness absences and health problems than white-collar employees. The results of this thesis confirm the result found by previous studies that blue-collar or manual employees had more severe burnout than white-collar or non-manual employees (Ahola et al., 2004; Borritz et al., 2006; Kalimo & Toppinen, 1997; Mohren et al., 2003; Norlund et al., 2010; Soares et al., 2007).

Burnout has been more often studied in white-collar jobs and there are only a few studies investigating if the work-related antecedents or the phenomenon itself differs between different occupational groups. It has been suggested that work-related antecedents may be different between occupations, although the syndrome itself might be the same (Winnubst, 1993). On a general level, different kinds of stressors can be categorized into job demands or job resources, which may affect the burnout dimensions in a similar way, regardless of occupation (Demerouti et al., 2001a).

The overall results from this thesis implicated that work resources may be better in white-collar jobs where the level of overall burnout symptoms is also lower. The problem of white-collar workers was quantitative work

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overload (i.e., time pressure). Blue-collar workers of this study, in turn, were more cynical towards their work and their professional efficacy was weaker. Their job seemed to offer fewer internal rewards. This may be one of the reasons why cooperation, role clarity, and appreciation were important in blue-collar burnout. According to the ERI model, reward is important in determining the effects of job demands on health (Siegrist, 1996) and accordingly, it has been shown that the reward dimension is significantly related to future health among both men and women (Niedhammer, Tek, Starke & Siegrist, 2004). Although individual factors may also vary, e.g., expectations regarding the work contents may differ, the importance of individual attitudes does not allow one to overlook the obvious problems in the blue-collar work and their adverse consequences.

The results of this study suggested that time pressure is not so detrimental if it is combined with good possibilities to influence one's work, role clarity, and appreciation. It has been found in previous studies that, in addition to a direct negative effect on burnout (Bakker et al., 2004), job resources can also buffer the impact of job demands on burnout (Bakker, Demerouti, Taris, Schaufeli & Schreurs, 2003; Taris et al., 2005). As Maslach, Schaufeli and Leiter (2001) noted, people may tolerate a greater workload if they feel their work is valued and well-rewarded. These factors may be in some cases more easily changed than workload as such, and should perhaps be the targets of an intervention. Research on personal trajectories of burnout also suggested that people experiencing, e.g., exhaustion only would benefit from time management training (Boersma & Lindblom, 2009). It is likely that careful consideration of work situations needs to be included in planning interventions.

According to the results of the thesis, autonomy and lack of supervisor's support were not related to any burnout dimensions among either white-collar or blue-collar employees when time pressure, role ambiguity, lack of appreciation, and conflicts in cooperation were also included in the models. This may be explained by the high correlation between the job stressors. Decision authority, a concept similar to autonomy, was related to all burnout dimensions in a previous study (Taris et al., 1999); and in the job strain literature, it has been found to relate to various health outcomes (e.g., Kivimäki et al., 2006). Lack of appreciation, which was operationalized as the valuation of work by oneself as well as by the supervisor and others outside of work, seemed to be a strong predictor of

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burnout: it was associated with all three dimensions, and the association was particularly strong in blue-collar employees. Lack of appreciation may capture something of a general attitude towards work, and may reflect the lack of reciprocity, which has been related to burnout (Bakker et al., 2000a; Schaufeli & Enzmann, 1998). The importance of experiences of other organizational resources, such as reward and fairness, has been acknowledged by other researchers (Boersma & Lindblom, 2009; Maslach & Leiter, 2008). Boersma and Lindblom (2009) suggested that experienced fairness might cause the disengagement development among those who were initially only exhausted. It is possible that job stressors serve as 'tipping points' or risk factors for burnout development differently among those who report symptoms on one burnout dimension only depending on that dimension (Boersma & Lindblom, 2009; Maslach & Leiter, 2008). These kinds of interaction effects between job stressors have seldom been at the focus of burnout studies.

It was found in the working population study in 1997 that the macro-level developments in the working life need to be taken into account when individual burnout is investigated (Kalimo, 2000). The risk of burnout was almost double in organizations that had laid off personnel without hiring replacements and in organizations where a threat of dismissal was perceived. It is surprising how rarely these kinds of changes in society are taken into account as determinants of individual well-being. Work strain is often only regarded in relation to the immediate working environment and perhaps the work-home relationship. The complexity of modern working life makes it very difficult to find generalized explanations to be applied to different kinds of groups of people or to different times. In the forest industry, the changes related to economic fluctuations and insecurity are likely to influence well-being. The overall structural changes in the forest industry have been more dramatic during the last few years, as it has witnessed the closure of several factories and major downsizing. It has been estimated that the Finnish pulp and paper industry will lose about 20–30% of its capacity in the years to come (Törmä & Reini, 2008). This means drastic changes compared to the changing times during which the data of this thesis was collected. It is possible that sector-specific hazards that are also dependent on the time frame should be more often included in epidemiological studies.

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If burnout is regarded as a crisis in self-efficacy, as Michael Leiter (1993) presented, the meaningfulness of work becomes essential. Meaningfulness is necessary for the development of task-related self-efficacy at work, because it provides the link between the individual goals and the vision of the organization. At least for those who find their work as central part of their lives, finding fulfilment from work is very important for the development of self-efficacy (Frone, Russell & Cooper, 1995). It is also possible that certain level of personal resources is beneficial in work environment, e.g., with high autonomy (Toppinen-Tanner & Kalimo & 2003). The question of individual dispositions or personality relates to the question of whether burnout is caused at least partly by individual vulnerability or primarily by work-related factors (Alarcon et al., 2009; Montero-Marín & Garcia-Campayo, 2010). There are studies showing that individual factors, such as neuroticism (Iacovides, Fountoulakis, Moysidou & Ierodiakonou, 1997), a sense of coherence, and a sense of competence (Kalimo et al., 2003), influence burnout. The general conclusion seems to be, however, that burnout is work-related, and specific working conditions produce reactions in employees independent of individual differences (Demerouti et al., 2001b; Hakanen, 2004; ter Doest & de Jonge, 2006). This has important implications for burnout prevention in determining its targets in working conditions rather than individual perceptions.

The most important message from the stress intervention studies seems to be that interventions are most effective when they are addressed to individual learning and organizational development simultaneously (van der Klink et al., 2001; Lamontagne et al., 2007; Marine et al., 2006; Schaufeli, 2003; Seymour & Grove, 2005; Sockoll, Kramer & Bödeker, 2008). In light of the sequential process of burnout, these actions can be seen as focusing simultaneously on different phases of burnout development. These interventions, if successfully implemented, seem to have generalized positive effects and also economic benefits. As burnout has been linked to various organizational outcomes, it is likely that by increasing organization-level resources combined with personal resources, burnout can also be diminished (Bakker et al., 2004; Swider & Zimmermann, 2010). At the same time, job engagement can be expected to increase (Salanova, Schaufeli, Xanthopoulou & Bakker, 2010; Maslach & Leiter, 2008). Therefore, actions against burnout and stress should

be a part of all organizations' normal human resources management policies and practices.

5.5 Health-related consequences of burnout – deteriorating work ability

The results of this study show that burnout can be regarded as a serious threat to health and work ability. In a prospective study design, burnout predicted future hospitalization periods, sickness absences, and new work disability pensions in several disorder categories. The work disability process is usually a long one, and it is often related to increasing duration of sickness absences and difficulties in returning to work after illness (Virtanen et al., 2007). It has been shown that, for instance, sickness absences predict future illness (Vahtera et al., 2010). Therefore, it is important to focus on early prevention of stress-related problems.

It has been shown by many previous epidemiological studies that stress at work is related to various indicators in health. However, in many studies, work-related stress is defined on the basis of job stressors and not stress symptoms or experiences (e.g., Belkic et al., 2004; Bongers, de Winter, Kompier & Hildebrandt, 1993; Stansfeld & Candy, 2006). The relationship between burnout (as a form of chronic stress) and health disorders has also been found previously, although there still are only a few longitudinal studies between burnout and ill health (Ahola, 2007). These studies show that burnout is a risk factor for poor health, as indicated by self-reported symptoms, or register-based sickness absences (Ahola et al., 2008; Borritz et al., 2006) and disability pension (Ahola et al., 2009). Of the different diagnostic categories, burnout has been especially related to mental, musculoskeletal, and cardiovascular disorders (Ahola et al., 2009; Armon, 2009; Armon, Melamed, Shirom & Shapira, 2010; Melamed, 2009; Melamed et al., 2006a). The same categories of disorders were found to be important with regard to burnout also in this thesis.

As indicators of ill health, sickness absences and hospitalization are mainly illness-related, but other factors also influence their prevalence. It has been shown that although the majority of work disability relates to poor health, exhaustion and burnout also increase the risk of disability (Ahola et al., 2009; Polvinen, 2009). The risk of future disability was

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especially high among low educated chronically ill persons. Chronic illness has also been associated with exhaustion (Polvinen, 2009) and burnout (Ahola et al., 2009). In this thesis, the aim was to study the independent effect of burnout on future ill health, and for this purpose, the influence of other illnesses was adjusted where possible. It is possible that especially by adjusting for self-reported chronic illness in case of work disability pensions, we have over-adjusted the effects of burnout. It is unlikely that perceptions of health were not influenced by burnout or its antecedent factors, especially when burnout was measured only once and the burnout history of the respondents was not known. In real life circumstances, illnesses often occur at the same time, and chronic stress develops in a circular or interactive process between an individual and his/her environment. Previous research shows, for example, that prevalence of burnout and depression overlap (Ahola, 2007; Schaufeli & Enzmann, 1998).

Sickness absences also tend to accumulate in a small proportion of the workforce, and this was also the case in the study company. According to the Finnish Worklife Survey, approximately half of the sick leaves were taken by only 6% of the population (Ylitalo, 2003). In the paper industry, the majority (60%) of sick leaves are long episodes (=>10 days) due to musculoskeletal disorders (Pahkin et al., 2010). This means that burnout prevention may have a true impact on sickness absences.

The disability retirement costs related to depression were almost 400 million euros in 2006, and there has been an increasing trend in the use of depressive medication during the last few years (Gould, Grönlund, Korpiluoma, Nyman & Tuominen, 2007). On a general level, it is hard to ascertain the relative contribution of burnout in the number of disability pensions, as burnout is not a medical diagnosis. We do know, however, that at least some depression cases are related to burnout problems (Ahola et al., 2005), and exhaustion was related with an increased risk of future disability pension independently of depression (Polvinen, 2009). It is important to study the burnout phenomenon as a process, as it seems that burnout develops from a mismatch between work and the individual and proceeds through different dimensions of burnout to ill health and work disability. The results of this thesis showed that burnout contributes to the risk of early retirement due to disability, even when health status is controlled for. This finding has also been confirmed by a population study (Ahola et al., 2009). It has also been shown in another study that an increase in burnout

over time was related with an increased risk of musculoskeletal pain, but no support was found for reverse causation (Armon et al., 2010). These results implicate that working people experiencing burnout symptoms have an elevated risk of future work disability.

5.6 Methodological strengths and weaknesses

The first methodological strength of this thesis relates to the longitudinal data that was available regarding the consequences of burnout, and partly for studying the persistence and antecedents of burnout. Regarding the consequences of burnout, the longitudinal data that was available in this study is particularly valuable. The outcomes of burnout have rarely been studied in a longitudinal design in the health context (Ahola, 2007).

In order to study effects that happen over time, a longitudinal study design is a necessity (Taris & Kompier, 2006; Zapf et al., 1996). This means that the causal claims concerning the sequential development of burnout symptoms in this thesis are unwarranted. However, the longitudinal study model included exhaustion as a predictor of future burnout dimensions, although no relationships other than exhaustion with future exhaustion was found significant. If the phenomenon under study is very stable, as seems to be in the case of burnout, it is difficult to predict burnout and find significant relationships between associated variables across time (Taris et al., 2005). It seems that time lag also play a role in analysing the data, not only in the meaning of finding longitudinal studies superior to cross-sectional studies when processes are investigated (de Lange et al., 2004; Zapf et al., 1996). Especially regarding the development of burnout as a syndrome, it is difficult to find the correct length of the time between study waves to show the causal relationships (Kasl & Jones, 2005; Taris et al., 2005). In this thesis, the follow-up time for antecedents of burnout was eight years, which is relatively long compared to other studies. In addition, in this thesis, burnout as a whole was measured only once, meaning that we do not know at exactly what point the measurement of burnout was done as regards the possibly gradual development of burnout. A long career in the same company is characteristic of the company personnel (Kalimo & Toppinen, 1999)

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increasing the stability of the antecedents of burnout. In this study, the health consequences of burnout were studied during periods between three and 10 years. Although severe health consequences may develop after a long time due to chronic exposure, it is also likely that overall prevalence of the most common causes of disability increases during time. However, the best way to capture the sequential development of burnout would be to conduct a longitudinal study consisting of more than two measurements separated by short time intervals (Taris et al., 2005). This would also make it possible to study reciprocal relationships between burnout and work environment, and health outcomes and burnout, as it is conceivable that burnout or other health problems also influence perception of work or its strainfulness (de Lange et al., 2005).

The second strength of this study was that register-based data from different national sources could be combined with self-reported burnout data. As many other previous studies used only self-reported absence data, this can be seen as a major strength. The registers we used have been regarded as comprehensive and reliable sources of information in Finland (e.g., Kajantie et al., 2006). By using objective register-based data combined with self-reported data, we were able to avoid some of the methodological shortcomings of other studies relying solely on self-reports, such as common method variance. The many-sided nature of absenteeism may demand multi-outcome measurement of absenteeism (Bakker, Demerouti, de Boer & Schaufeli, 2003a). In this thesis, only frequency of diagnosed sickness absences was used as an outcome of burnout. It has been suggested that sickness absence duration should also be measured (van Rhenen, Blonk, Schaufeli & van Dijk, 2007). According to a recent meta-analysis, however, whether absenteeism is measured based on frequency or duration did not moderate the burnout-outcome relationships (Swider & Zimmerman, 2010).

Thirdly, several important confounders could be adjusted in the models where health-related consequences of burnout were investigated. These confounders include well-known risk factors for cardiovascular disorders (medication for diabetes) or previous illness in the same disorder category. However, other illnesses contributing to outcome variables were not included in the models as confounding factors in case of sickness absences, where only previous absence in the same disorder category was adjusted for. It is possible that other illnesses, especially depression, may also influence future health (Hämäläinen et al., 2009). Finally, health

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habits that are a known risk factor for future health (Kujala, Kaprio & Koskenvuo, 2002) and which have been found to relate to chronic stress (Kouvonen et al., 2007; Siegrist & Rödel, 2006) were not adjusted for.

The sample was large and heterogeneous, as all employee groups of the company were included. The results are also in line with other studies, especially regarding the results of the whole study population concerning antecedents and sequential development of burnout symptoms (for reviews, see Schaufeli & Enzmann, 1998). In this thesis, several job stressors were used as predictors of burnout to capture the important work characteristics of different occupations represented in this study. Since all participants were from the same company, a generalization of the study results to the whole working population is limited, because only forest industry employees were investigated. However, one of the strengths of this study was that comparisons between white-collar and blue-collar employees were possible to make within the same organization. It is typical of the study company that the personnel have been working there for most of their working careers without changing their position (Kalimo & Toppinen, 1999). This increases the stability of the work environment, at least on an organizational level.

Another limitation concerning the study sample was that exclusively working (and thus relatively healthy) employees were included. This means that as regards to burnout, those who are ill, disabled, or who have left the organization because of work-related stress are not considered; this is the “healthy worker effect” (Mohren et al., 2003; Schaufeli et al., 2001; Schaufeli & Enzmann, 1998). However, this would only stress the importance of the longitudinal findings of this thesis, showing that even relatively mild burnout was predictive of future ill health and disability. Including these possibly work-disabled people in the continuum of burnout is also important, not only to stress the importance of the phenomenon to employers and society, but to more fully understand the phenomenon among researchers.

The present study included questionnaire survey data and register-based data. The antecedents of burnout and burnout were measured with self-reports only, and results may be influenced by common method variance. However, method variance is considered not to be a problem in complex analyses with many variables, because it makes observed results conservative estimates of underlying relationships among constructs (Spector & Brannick, 2010).

5.7 Conclusions

The purpose of this thesis was to investigate the whole process of burnout from its antecedents through the development of the syndrome to the severe health-related consequences of burnout. The hypothetical study model was investigated in five separate studies. As for the hypothetical study model presented in Chapter 2 (Figure 3), the whole process was studied in separate pieces. However, this would be a methodological challenge if the purpose was to study burnout as a multidimensional concept. Despite separate studies on the burnout process, a theoretically and empirically coherent view is formed, where burnout is a strongly work-related, multidimensional phenomenon with severe health-related consequences.

The results from this thesis support a definition of burnout as a syndrome consisting of three dimensions: exhaustion, cynicism, and lack of professional efficacy among different occupational groups and nationalities, verifying the results found in many other studies. As a work-related phenomenon, burnout should not be considered in isolation from its antecedents and consequences. The results of this study show that lack of appreciation, time pressure, role ambiguity, and conflicts in cooperation are especially associated with burnout and should be targets for health promotion. No longitudinal relationship between job stressors and burnout could be established over and above the cross-sectional relations. This result is in line with some previous studies showing how difficult it is to find a longitudinal relationship between job stressors and such a stable condition as burnout.

Of the dimensions of burnout, exhaustion seems to be the first and most important sign of burnout. This result is in line with most of the previous studies showing the importance of exhaustion as the core of burnout. In the sequential process of burnout symptoms, exhaustion was followed by cynicism and lack of professional efficacy. This result is in line with Leiter & Maslach (1988) theory, although only cross-sectionally studied.

The consequences of burnout for future ill health and work disability were found to be severe, as burnout was predictive of future hospitalization periods, sickness absences, and disability pensions. These results verify the results from earlier cross-sectional studies on the importance of burnout in health deterioration process. Mental, cardiovascular, and musculoskeletal disorders were related to burnout. These three categories of disorders are

the major reasons for disability pensions in Finland, stressing the importance of the results. Therefore, the importance of preventing burnout as one means to alleviate health problems can be strongly recommended.

5.8 Avenues for future research

From a methodological point of view, intervention studies are called for. They are needed to show that a change in burnout was actually related to a change in a causal factor, e.g. an occupational antecedent. This kind of relationship between changes in job stressors and burnout due to a group-level intervention has been found in some burnout intervention studies (Hätinen et al., 2004; Le Blanc et al., 2007; Salmela-Aro, Näätänen & Nurmi, 2004). Most of the interventions on burnout have focused on universal solutions rather than specifically addressing the uniqueness of burnout antecedents (Halbesleben, 2006; Swider & Zimmerman, 2010). From a practical point of view, the more general approaches may as well improve well-being in organizations (Semmer, 2005), but they do not necessarily take the theory on burnout antecedents further. The research on consequences of burnout would benefit from a similar kind of strategy, that is, whether changes in burnout will cause improvements in health over time.

It is not likely that burnout symptoms proceed purely as a chain reaction, that is, from exhaustion only to cynicism only, and so on. The symptoms are likely to occur simultaneously, one symptom accompanied by another one or the other two, although some sequences may be found more likely than the others in a large group of people. It is also possible that the sequences vary in different work environments. This is an important point, and more research is needed to solve this question. Longitudinal studies are needed, and these need to be complemented with intervention study designs and designs where (for instance) newcomers in an organization are investigated during their socialization process and thereafter. As the interaction between burnout and work environment is strong and there is evidence that burnout also affects the perception of the work environment (de Jonge et al., 2001) and there can be feedback effects between the dimensions of burnout (Taris et al., 2005), development of burnout needs to be seen as a process or a circle

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rather than a continuum. Methodologically this is a challenge, as only a limited number of variables can be investigated at the same time and longitudinal intervention studies are difficult to perform.

Most researchers from intervention studies agree that the most effective interventions for burnout prevention are those which have combined improvement in the working environment with individually targeted measures (van der Klink et al., 2001; Marine et al., 2006; Lamontagne, 2007; Sockoll et al., 2008). Especially participative approaches have proven to be effective as they increase possibilities to exert control over one's job (Hätinen et al., 2009; Le Blanc et al., 2007). The intervention studies on burnout should further clarify the differences between the burnout trajectories or profiles found in earlier studies (Boersma & Lindblom, 2009; Demerouti et al., 2005 by using the Singh et al. Facet Burnout measure which is drawn from the MBI; Hätinen, 2007; Maslach & Leiter, 2008). By investigating why some groups of people do not participate (Ahola et al., 2007) or benefit from interventions (Hätinen et al., 2009), it is possible not only to develop interventions but also to gain insight into the burnout process.

As the results from this thesis show, the resources and demand factors at work are likely to be different across occupational groups directing the focus of organization-level interventions. Some researchers suggest that the distinction between white-collar and blue-collar jobs is fading, as information technology changes the nature of work and occupational status is defined more in terms of skills and knowledge (Langan-Fox, 2005). This means that we have to be alert to changing nature of work influencing health hazards.

There are still only a few studies investigating the influence of individual characteristics in the burnout process (Kalimo et al., 2003; Swider & Zimmerman, 2010). But this is an area that is now growing, especially after the introduction of the job engagement concept, which seems to take the burnout discussion back to a more individual emphasis. The focus is especially on trying to identify individual resources that could play a role as protective factors from burnout, such as self-efficacy (see Garrosa, Moreno-Jiménez, Liang, González, 2006). Even if burnout was work-related, individual factors may play a role as moderators in the process through which work influences burnout. In the changing worklife, it may be wise to focus on promoting individual resiliency to

work environment and constant changes, but it should not mean that striving towards more favourable working conditions is forgotten.

The underlying physical and biological pathways through which burnout has its effects on physical ill health should be further investigated (e.g., Melamed et al., 2006a). It means that the process of work disability as a whole should be studied further. That is, whether the work disability process proceeds from sickness absences and hospitalization periods to disability pension and what factors influence this process. The indicators of ill health used in this thesis may represent different phases of health deterioration, but further research is needed to clarify the progressive work disability process. In the process of deteriorating health, chronic stress may lead to illness directly through several pathogenic physical and physiological paths (McEwen, 1998; Kivimäki et al., 2006), or it may increase the likelihood of difficulties in coping with job demands or of adopting poor health habits (de Lange et al., 2005). In this thesis, burnout was studied as an independent predictor of different disorders. In the health deteriorating process, however, it is likely to also be a concomitant of other processes leading to poor health, and its role as a contributing factor should also be studied.

5.9 Practical implications

The results of this thesis suggested that early prevention of burnout should be aimed at especially preventing exhaustion. It has also been shown by intervention studies that exhaustion is the easiest to influence (for a review, see Le Blanc & Schaufeli, 2008). Cognitive-behavioural approaches have proven to be effective in counteracting exhaustion, but they should include organizational approaches or be embedded in an organizational context to be effective on a longitudinal scale (for reviews, see Lamontagne et al., 2007; Marine et al., 2006, Van der Klink et al., 2001). As cynicism is often associated with exhaustion, and may also be regarded as an ineffective coping strategy in the process of burnout, teaching more efficient and functional coping strategies could be useful for the prevention of burnout. This means that training in cognitive and behavioural strategies may benefit people at risk of burnout (Schaufeli & Enzmann, 1998). These could include, for example, rehearsing problem-

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focused coping skills and career-focused goal setting combined with stress inoculation training and promotion of career management self-efficacy. How to implement these kinds of preventive actions in different kinds of organizational contexts and occupational groups remains a challenge. The working environment should also be a continuous target for improvement, as burnout seems to be strongly related to one's job stressors. Reviews on job stress interventions also emphasize that organization-level interventions, such as participative action research combined with individual-level interventions are the most effective (e.g., Lamontagne et al., 2007; Le Blanc et al., 2007).

Based on the results of this study, the use of a sum score of burnout or a burnout factor composed of the three correlated symptoms of burnout in structural equation models can be recommended. From a theoretical and practical point of view in the study of the sequential development of burnout, the three dimensions have to be separated. This needs to be done, first to further investigate the temporal development of burnout syndrome, secondly to target the critical time points for preventive actions, and thirdly to find out if there is a qualitative turning point for burnout to become chronic and not returnable to "normal" fluctuations in stress and recuperation. As burnout has been shown to be related to future ill health, this is especially important.

Whether we see burnout as a form of (mental) illness, a cause of or a mediator between job stressors and illness, or a vulnerability to stressful situations caused by personality factors, has an effect on how we conceptualize burnout and what the practical implications are. The results on severe health-related consequences obtained in this thesis clearly indicate that burnout has to be taken seriously, and persistence of burnout symptoms referring to its chronic nature calls for actions early enough. As the burnout measure is very easy to use in organizations, it may be highly recommended for use as a screening instrument for risk of burnout. On an organizational level, the total score for burnout may be used as an indicator of prevalence of burnout, and scores of separate dimensions may be used as indicators of where the measures should be aimed at. The cut-off scores may also be used to indicate the severity of the problem, as it has been shown that an especially severe level of burnout relates to future health problems. Using the cut-off scores based on original response and the frequency of perceived symptoms instead of a distribution of a norm population may be recom-

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mended as an ecologically valid and generalizable alternative. The use of the instrument on an individual level should always complement a clinical evaluation and interview and not replace it.

To prevent burnout in its early phases, we need information and research results on the process of burning out and ways to prevent it in different phases of its development, as well as information on its consequences on mental and physical health. This information can be used, not only to justify the benefits of work ability promotion programs to employers, but also for distinguishing the stress-relatedness of physical illness. This kind of information can be used when a return to work after illness is planned. As it seems, the prevention of stress and burnout may serve as a means of preventing future problems in physical health as well.

Notwithstanding the many viewpoints and alternatives for theory building, Wilmar Schaufeli writes: "A grand theory of burnout will always remain a dream, simply because the phenomenon is too complex and multi-faceted" (Schaufeli, 2003, p. 12). A similar conclusion is rooted in the notion made by Michael Leiter and Christina Maslach (1999). They say that the appeal and power of the three-component model of burnout derive from its capacity to reflect the complexity inherent in the relationships of people with their work (Leiter & Maslach, 1999, p. 472).

Almost 20 years after the introduction of the general version of the MBI, burnout research has widened its scope to a more positive approach trying to identify the processes opposite of burnout, such as job engagement (Maslach & Leiter, 2008; Schaufeli et al., 2009). It is more and more often discussed how individual motivation and job engagement can be increased (Leiter & Maslach, 2010; Schaufeli et al., 2009). On the other hand, the consequences and treatment methods for burnout are being more widely studied (e.g., Ahola et al., 2007; Shirom, 2009). To capture the many-sided concept of well-being, the positive end of the continuum between engagement and burnout brings a new insight into burnout research and to practical work in promoting well-being. However, people who are in the middle of a burnout crisis do not necessarily benefit from the promotion of job engagement, and vice versa. Although only 3–7 percent of the working population suffers from serious burnout, this means that tens of thousands of people need help and solutions for their working situation.

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ORIGINAL PUBLICATIONS I–V

This thesis tries to answer some questions that still remain open or controversial in burnout research. These questions relate to the process of burnout and can also be related to its practical implications: What is the content and structure of burnout? How does burnout develop? Are there differences in the burnout process across occupations? What kind of negative consequences does burnout have on future work ability and health? Answers to these questions can help in solving several practical challenges: How to recognize burnout early enough? What are the relevant targets for preventing burnout? Should we strive to find universal theories on burnout and general guidelines for its prevention or do we need specific or tailored programs? And finally, what is the price for not investing in prevention of burnout in terms of poor health and disability?

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