

Burnout and related conditions in managers: a five-year longitudinal study

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ABSTRACT

Background: There is a paucity of longitudinal studies that assess simultaneously the interaction between and effects of well-established health-related factors and a lack of research that provides results that can be understood by practitioners with a scientific background and that have implications for better practice that have a good chance of being implemented. We analysed associations of burnout with vital exhaustion (VE), depression, social support, effort-reward imbalance, sleep quality, recovery, health and health impairments, and physical activity in a sample of approximately 200 managers over five years. Burnout was assessed using the Copenhagen Burnout Inventory (CBI) in a modified form for managers in both English and German, and the Maslach Burnout Inventory (MBI). *Results:* Intratest analyses yielded substantial correlations between scores on the scales for burnout, VE, and depression. Newly developed scales for recovery, social support, person-work match, and work strain showed plausible associations with the burnout and depression scales. In time-lagged analyses, burnout predicted depression, but depression did not predict burnout. *Conclusion:* The CBI yielded results that have important implications for practice that the MBI did not.

Keywords

Burnout – depression – ,effort-reward imbalance‘ – ,social support‘ – ,rest and recovery‘ – ,physical activity‘

1 Background

Burnout is an increasingly common phenomenon in the modern world. To avoid, manage, and treat burnout it is necessary to have a good understanding of what it is, what causes it, and what debilitating conditions commonly accompany it. Shirom stresses the need to arrive at a clear operational definition of the construct through scientific investigation (Shirom, 2005, p. 263). Such a definition would ensure that research on burnout would be investigating a valid construct and that it would be investigating the same construct, thus enabling the results of studies to be compared, which in turn would enable researchers to be clear on exactly what progress was being made. Shirom also recommends that measures of burnout

take into account the entire causal nexus of factors that produce it and should consider the conditions that commonly accompany it (Shirom, 2005, p. 263). Such research should include different measures of burnout and should control for phenomena that may be similar, such as depression and negative affect. Such an approach should yield insight into the nature of burnout and increase our understanding of the relations among the various conceptualizations of burnout that have so far been formed (p. 269). The importance of following Shirom’s recommendations is highlighted by Cox, Tisserand, and Taris who, in a contemporary paper, state that current progress in research into burnout is ,... slow from a scientific and practical point of view‘ (Cox, Tisserand, & Taris, 2005, p. 189).

In light of the current state of research and taking full cognizance of Shirom's recommendations, we conducted a 5-year field study on the managerial staff of a Swiss company to collect and analyse data on the following: factors measured by two major burnout inventories (the Maslach Burnout Inventory and the Copenhagen Burnout Inventory) and a scale that measures the related concept of vital exhaustion (the Maastricht Vital Exhaustion Questionnaire), factors that are commonly held to be causal precursors to burnout and that may accompany it, and factors that may plausibly be thought to alleviate symptoms of burnout. In the analysis, we tested for relationships between the results for the subscales in the two burnout inventories, the scale for vital exhaustion, and the scales for generative, accompanying, and ameliorating factors; both within waves and across waves. The expected benefit of this approach was that, by the simultaneous testing of the abovementioned factors, we would be able to determine what relationships obtain among conditions that commonly accompany burnout in an intraperiod analysis, and determine predictors of burnout in a time-lagged analysis, thereby yielding a better understanding of medium-term effects of these predictors on burnout.

We were further motivated by the discussion of the 'academics-practitioners' topic published in the *Journal of Occupational and Organizational Psychology* 2006, 79(2) (Gelade, 2006; Hodgkinson, 2006; Symon, 2006; Wall, 2006) to obtain research results that can be understood by practitioners with a scientific background and that have implications for better practice that have a good chance of being implemented. We strove for a research process that met the demands of both our research group and the decision makers in the company, thereby forging a strong relationship. The risks and opportunities of conducting research in collaboration with companies have been discussed critically previously (Anderson, 2007; Anderson, Herriot, & Hodgkinson, 2001; Walker, 2008). It would not have been possible to maintain this project for five years without a strong partnership such as that which we managed to build.

The study, called 'Swiss Integrative Stress in Managers' (SCHISM; German: 'Schweizerische Integrative Stress bei Managern' – Studie), was conducted from 2006 to 2010, inclusive, on managers in the Swiss headquarters of a large international pharmaceutical company that has approximately 2200 employees. The company offers a good environment for such a study because, in 2005, the HR department of the company drew up a blueprint for expanding its internal preventative health-care programme by a) establishing regular monitoring for the early detection of managers who were at risk of exhaustion, and b) making a start to the establishment of a location-wide health-intervention

programme, with the intent to improve the programme continuously. Our study of burnout and related phenomena was expected to help the company to develop and implement an efficient and effective programme for health care among its managers.

We now present a brief overview of the current state of research on burnout and related phenomena.

Burnout

That burnout is increasingly prevalent in the modern world is widely acknowledged, yet no consensus has yet been achieved as to its nature. On the positive side, most hold that '...emotional exhaustion is the core component' (Cox, et al., 2005, p. 187). On the negative side, a clear operational definition is lacking. Characterisations of burnout often include certain moods and emotions, physical symptoms, and changes in behaviour and attitude, for example, feelings of helplessness and hopelessness, anxiety, lack of energy, being overtaxed by assignments, diminished creativity and performance, reduced motivation for work, and cynicism vis-à-vis one's own work and that of others (e.g. Maslach & Jackson, 1984; Maslach & Leiter, 1999; W. Schaufeli & Taris, 2005; Shirom, 2005). However, such characterisations, while presenting a family of phenomena that can be used to identify burnout in a rough and ready manner, fall far short of presenting a precise operational definition that specifies clearly a set of observational phenomena that are individually necessary and jointly sufficient for the accurate use of the term 'burnout'. Without an adequate conceptualisation that can be applied to all cases of burnout in a variety of situations, and without consensus on such a conceptualisation, measurements of burnout, scales that capture levels of its severity, and prevalence rates will all be subject to doubt and have questionable applicability.

The Maslach Burnout Inventory is used most commonly to capture burnout (Maslach, Jackson, & Leiter, 1996; W. B. Schaufeli, Leiter, Maslach, & Jackson, 1996), while Kristensen et al. offer a different perspective on burnout in their newer Copenhagen Burnout Inventory (Kristensen, Borritz, Villadsen, & Christensen, 2005).

The recent critical discussion of the Copenhagen Inventory has highlighted the need for a better theoretical conceptualisation of burnout (Cox, et al., 2005; Kristensen, et al., 2005; W. Schaufeli & Taris, 2005; Shirom, 2005).

Vital Exhaustion

The symptoms of physical and emotional exhaustion that are measured in the burnout scales in the Maslach and Copenhagen Inventories bear at least a surface similarity to the symptoms that accompany vital exhaustion. Vital exhaustion is a construct used in

clinical practice to capture whether, and the extent to which, a patient's energy levels deviate from the norm. Examples of items on the Maastricht Vital Exhaustion Questionnaire that are used to determine whether a patient has symptoms that indicate vital exhaustion are „Do you feel weak all over?“, „Do you lately feel more listless than before?“, and „Do you feel dejected?“ Items that pertain to certain negative emotional states are included because these are taken to indicate vital exhaustion.

Burnout and vital exhaustion

The similarity in the symptoms that are tested for in the burnout inventories and the vital exhaustion questionnaire indicates that burnout and vital exhaustion may be related. There is further evidence to suggest a relation between the two constructs: both seem to be related to health problems, both mental and physical.

First, burnout and vital exhaustion are related to depression in some way. Both vital exhaustion and depression (Glass & McKnight, 1996; Kopp, Falger, Appels, & Szedmak, 1998) and burnout and depression (e.g. Iacovides, Fountoulakis, Kaprinis, & Kaprinis, 2003; Melamed, Shirom, Toker, Berliner, & Shapira, 2006) are co-present in a significant percentage of cases, though they can also occur independently. People who are suffering from pronounced burnout are at increased risk of becoming depressed, even severely depressed, and people who are already severely depressed are at increased risk of developing burnout (Ahola et al., 2005).

Second, both vital exhaustion and burnout carry risks to physical health, particularly heart disease. Many patients were found to have unfavourable scores for vital exhaustion before they developed critical heart disease (Appels, 1997, 2004; Appels, Bar, Bar, Bruggeman, & de Baets, 2000; Appels, Hoppener, & Mulder, 1987). High scores for vital exhaustion predict an increased risk of developing serious medical conditions, such as myocardial infarction and stroke (Andersen, Diderichsen, Kornerup, Prescott, & Rod, 2011; Kop, Appels, Mendes de Leon, de Swart, & Bar, 1994; Prescott, et al., 2005; Schuitemaker, Dinant, van der Pol, & Appels, 2004; Schuitemaker, Dinant, Van Der Pol, Verhelst, & Appels, 2004). In studies on coronary heart disease and appropriate therapies, vital exhaustion has proven to be an important indicator of health status (Koertge, et al., 2008; Lesperance, Frasure-Smith, & Talajic, 1996; Shapiro, 2005). A direct link has been established between burnout and serious medical conditions (e.g. Melamed, et al., 2006) and with subsequent disability pensions (Ahola, et al., 2009). Furthermore, several studies have found a close connection between suffering from an episode of depression and the later risk of developing coronary heart disease (e.g. Everson-Rose & Lewis, 2005; Lett, et al.,

2004; Rozanski, Blumenthal, & Kaplan, 1999), which is significant, given the association between burnout and depression.

It is not clear what we should conclude from this evidence about the relationship between burnout and vital exhaustion. The causal nexus involved seems to be complex and it is likely that a comprehensive map of the territory will require a considerable amount of research. Given the similarity between the symptoms of burnout and vital exhaustion, it is likely that the simultaneous testing of the scales for fatigue and exhaustion on the Copenhagen Burnout Inventory, exhaustion on the Maslach Inventory, and vital exhaustion on the Maastricht Vital Exhaustion Questionnaire will play an important role in such research.

Health and impaired activity

As noted above, burnout and vital exhaustion are associated with health risks, both mental and physical. Space does not permit a full review of clinical research on these risks, so we use the research cited above as a proxy for the full range of risks. It is worthwhile considering the possibility that poor health can increase susceptibility to burnout and vital exhaustion, given the presence of other factors, in that poor health can result in impaired activity, which will increase stress. It is also likely that burnout and vital exhaustion increase the risk of falling into poor health. A negative feedback mechanism may be at work.

Effort-reward imbalance and overcommitment

It has been found that the risk of becoming depressed or burned out increases as professional demands increase (Ahola, et al., 2006; Tennant, 2001; Tennant & McLean, 2001).

When agents do not regard the reward that they receive for their efforts as sufficient, they become dissatisfied. This dissatisfaction may be a causal factor in the development of burnout. In light of this, a number of researchers have used the effort-reward imbalance model developed by Siegrist in their studies of burnout (e.g. Bakker, Killmer, Siegrist, & Schaufeli, 2000; Hamer, et al., 2006; Siegrist, 1996). Within this model, the extent of effort-reward imbalance is measured by the gratification index, which is given by the quotient of the effort that individuals invest and the return (e.g. receiving respect, adequate support and salary) that they receive from their employer. The model also uses the construct 'overcommitment', which is intended to capture the lack of ability to unwind and keep things in perspective, which may well be a precursor to burnout. A review and meta-analysis of the measurement of the effort-reward imbalance model have enabled recommendations to be provided with respect to poor outcomes for health, such as cardiovascular dysfunction. On this basis, thresholds for satisfactory and per-

missible levels of gratification and overcommitment, respectively, have been identified (Siegrist, et al., 2004; van Vegchel, de Jonge, Bosma, & Schaufeli, 2005).

The effort component of the effort reward-imbalance model is the sum score of five items. Two of these items measure the degree to which the employee is „... under constant time pressure due [sic!] to heavy work load“ and „... often pressured [sic!] to work overtime“. While planning our study, we discussed how to measure work load with the decision makers of the company and managers from other companies. Important results of these discussions were a) that there are many other reasons for constant time pressure (e.g. a lack of timely communication), b) that many managers work overtime without being pressured, and c) that many managers have a high work load yet are not dissatisfied with it. To incorporate these results into our study, we introduced a three-item scale, which we called work strain, that captures the degree of satisfaction with the work load, the number of hours worked, and the required pace of working.

Rest and Recovery

To understand the causes and consequences of stress and burnout, it should be beneficial to study the degree of psychological attachment to work, together with the amount and quality of time spent resting and recovering, among individuals who experience stress and are suffering from burnout (e.g. Sonnentag, 2005, 2005; Sonnentag & Niessen, 2008; Winwood, Winefield, Dawson, & Lushington, 2005; Zijlstra & Sonnentag, 2006). Overcommitment can affect rest and recovery. People who have difficulty in unwinding tend to allow themselves too little rest, both professionally and personally. In addition, people who work hard and are overcommitted do not sleep as well as others (Kudielka, von Kanel, Gander, & Fischer, 2004). Both the quality and duration of sleep affect recovery greatly and are important resources for coping with stress (Sonnenschein, Sorbi, van Doornen, Schaufeli, & Maas, 2007). Long-lasting disturbances in the quality and duration of sleep increase the risk of health problems and becoming exhausted, both physically and emotionally (Jenkins, Jono, & Stanton, 1996; Jenkins, Stanton, Niemcryk, & Rose, 1988). Longitudinal studies have shown the negative effects on health of poor-quality rest (Kivimaki, et al., 2006; van Amelsvoort, Kant, Bultmann, & Swaen, 2005). Poor-quality rest, for example fitful sleep, can interfere with the ability to cope with stress in the professional context and can promote exhaustion, both emotional and physical (Sluiter, de Croon, Meijman, & Frings-Dresen, 2005; Sonnentag, 2005). Further, research has shown that a reduction in the quality of rest is associated in the short term with changes in hormonal balance that are detrimental to coping with stress (Sluiter, Frings-Dresen, Meijman, &

van der Beek, 2000). In contrast, adequate periods of rest and recovery can be expected to reduce stress and hence alleviate symptoms of burnout.

Social Support

Social support, for example, emotional support from one's family or partner, plays an essential role in managing health and burnout, and even affects mortality, so social support is now included as a matter of course as a variable in research on organisational stress, and hence burnout (Broadhead, et al., 1983; Everson-Rose & Lewis, 2005; Hemingway & Marmot, 1999; House, Landis, & Umberson, 1988; for an overview see also Schwarzer & Leppin, 1991). In his meta-analysis of sources of social support and burnout, Halbesleben stresses that the relationship between work-related- and non-work-related social support and dimensions of burnout needs to be clarified (Halbesleben, 2006).

Sport and exercise

Sport and other physical activities are highly effective for managing and preventing health impairments (Bouchard, Blair, & Haskell, 2007; Morgan, 1997; Raglin, Wilson, & Galpher, 2007). Further, regular exercise and sporting activity are probably beneficial for alleviating negative emotions, such as anger (Hassmen, Koivula, & Uutela, 2000) and anxiety (Raglin, et al., 2007). Anger has been shown to be related closely to self-reported stress and burnout in other occupational samples (e.g. Baruch-Feldman, Brondolo, Ben-Dayan, & Schwartz, 2002; Brondolo, et al., 1998). Thus, managers' participation in sport and other forms of exercise warrants careful study. Managers who report a heavy workload and insufficient time will likely reduce their physical activity, thereby doing the opposite of what is recommended and increasing the likelihood that they will suffer from poor health (see also Bernaards, et al., 2006; Sherwood & Jeffery, 2000).

It is likely that individual characteristics will play a critical role in determining whether or not a person develops burnout, given the same environmental factors. Hence, whatever our results, the causal nexus will not be complete. So, we are looking for strong statistical significance regarding the relations between phenomena, to indicate the presence of causal factors that are necessary but not sufficient for the development of burnout.

2 Methods

2.1 Sample

Participation was voluntary and open to all middle and top managers. The study has been approved by the ethics committee of the ETH Zurich. The participants could

Table 1: Sample size, age, gender, and response rates for all waves.

Year	2006			2007			2008			2009			2010							
	m	f		m	f		m	f		m	f		m	f						
Language	GER	EN	GER	EN	GER	EN	GER	EN	GER	EN	GER	EN	GER	EN	GER	EN				
Age M (SD)	45.5 (7.4)	44.0 (5.5)	58.5 (7.4)	56.0 (-)	41.0 (7.0)	57.1 (6.9)	57.2 (9.5)	59.2 (6.7)	41.7 (8.4)	58.6 (6.5)	58.0 (8.7)	54.5 (9.8)	40.8 (8.0)	56.7 (7.5)	55.5 (10.6)	55.7 (8.5)	42.5 (7.5)	57.7 (8.7)	58.0 (10.7)	59.0 (8.5)
N	75	7	20	1	89	12	31	6	79	10	42	6	72	14	54	11	60	7	46	4
Total	105			138			137			151			117							
Approximate max. sample size (N) ¹	200			220			220			220			220							
Response rate (%)	52			64			62			69			55							
Repeaters from previous year N (%)	-			17 (12)			28 (20)			43 (29)			52 (27)							

join the study during any of the five assessment periods. The maximum available sample size for participants was estimated by the company's personnel department (+/- 5 participants) and varied from year to year (from 200 to 220) due to expatriated managers and maternity leave. Repeaters were defined as participants who participated in both the current and the previous year; to maintain a constant 1-year repeated measurement period, participants from earlier waves were excluded from the respective calculations of repeater rates. Table 1 provides information on demographic factors for the sample and the statistics for participation.

2.2 Data collection

Data were collected in five waves from 2006 to 2010, via anonymous assessments forms that were completed using a secure online network. The researchers and company decision makers discussed how long it should take to complete the survey, and decided on approximately 30 minutes. Pretests were conducted to ensure that the surveys could be completed in the specified time. The time limit was imposed by the company to limit the time spent completing the surveys, but in practice, the managers were free to spend up to 2 hours on them. The data were assessed each year in July and August. Personal login data were used to merge the surveys. The server-side code that was used to process input from the online forms ensured that the participants completed all questions on an inventory before they were allowed to proceed to the next one. Thanks to this input validation, there are no data missing from the data set. An English and a German version of the survey were made available to the participants, all of whom spoke at least one of the two languages.

2.3 Personal incentive

All participants received an automatically generated individual report in an encrypted file in .pdf format that they could download and open using their personal access data. The report summarised their personal results for the subsection of scales for which cut-offs had been published. The cut-offs were derived from either the manuals supplied with the scales (e.g. the Patient Health Questionnaire for Depression, PHQ-9) or recommendations given in the literature (e.g. on vital exhaustion). Participants with high scores for burnout, vital exhaustion or depression were invited to contact providers of follow-up care: physicians, coaches, and psychologists.

2.4 Measures

To meet the requirements of a) a 30-minute time limit for the complete assessment, b) maximal suitability for

managers in industrial settings, and c) a preference for using freely available inventories that were not restricted in respect of further electronic processing, we constructed several new short scales (see below in this section). The reliability of the scales used in waves 1 and 2 are given in Table 2, and the reliability of those used in waves 3 to 5 are given in Table 3. The English versions of the newly constructed scales are given in **Appendices A-F**, and the German versions in **Appendices G-L** (online supplement).

Burnout

Burnout was measured using the Maslach Burnout Inventory – General Scale (W. B. Schaufeli, et al., 1996) in conjunction with the German authorised version developed by Büssing and Glaser (Büssing & Glaser, 1998), and the English version of the Copenhagen Burnout Inventory (Kristensen, et al., 2005) in conjunction with our own German-adapted translation.

The Maslach Inventory is used most commonly to capture burnout. (Maslach, et al., 1996; W. B. Schaufeli, et al., 1996). It measures three factors: ‚depersonalisation‘, ‚personal accomplishment‘ and ‚exhaustion‘. Depersonalisation is explicated as „... an unfeeling and impersonal response toward recipients of one's service, care, treatment, or instruction“, and personal accomplishment as „... feelings of competence and successful achievement in one's work with people“ (p. 4). The Maslach Inventory regards exhaustion as a sine qua non of burnout. Items in this factor cover symptoms of both emotional exhaustion, such as ‚I feel emotionally drained from my work‘, and physical exhaustion, such as ‚I feel tired when I get up in the morning and have to face another day on the job‘.

The Copenhagen Burnout Inventory offers a different perspective on burnout (Kristensen, et al., 2005). Again, exhaustion is regarded as a sine qua non of burnout (p. 196). However, the Copenhagen Inventory differs from the Maslach Inventory in two respects. Firstly, it addresses only exhaustion. Secondly, it uses three area-specific scales to measure exhaustion, rather than a single general scale: the work-related burnout scale (which covers work-related emotional exhaustion with such items as „Is your work emotionally exhausting?“), the client-related burnout scale (which covers what we may term ‚tolerance exhaustion‘ with such items as „Are you tired of working with clients?“), and the personal burnout scale (which covers general nonwork-related symptoms of physical and emotional exhaustion with such items as „How often are you physically exhausted?“ and „How often are you emotionally exhausted?“).

Kristensen et al. give a number of sustained arguments for rejecting the Maslach Inventory (Kristensen, et al., 2005). Two of these are also relevant to and sufficient for preferring to use the Copenhagen Inventory

when performing studies. One addresses the design, and hence the validity, of the Maslach Inventory directly. It is claimed that the relation between and numeric integration of the three subscales of the Maslach Inventory is unclear, in that the inventory mixes an individual state (exhaustion), a strategy for coping with exhaustion (the development of a depersonalising attitude), and a causally predisposing factor for exhaustion (feelings of personal accomplishment) (loc. cit., p. 194). Schaufeli and Taris criticise the scientific basis on which the Maslach Inventory was developed: the factors that are measured in the inventory are based on what seem, on the face of it, an arbitrary set of items for which no rationale for inclusion is provided (W. Schaufeli & Taris, 2005, p. 258). The other argument addresses the extent to which the Maslach Inventory is useful for practical research: it is not in the public domain and its further electronic processing is restricted by copyright, which limits the extent to which it can be used, which in turn hinders the efforts of the research community. In the interests of swift scientific progress, our research group advocates using open-access research instruments; we thus aimed for a stepwise replacement of commercial inventories in the course of the measurement waves with inventories that do not have license fees or restrictions on further electronic processing, e.g. in online surveys.

We adapted the client-related burnout scale from the Copenhagen Inventory by replacing ‚clients‘ with the wider category of ‚the people you have contact with in the course of your work‘ and categorised the managers as follows: People Managers with a number of employees reporting to them directly or indirectly, typical Business Partners, such as HR-Business Partners with internal customers, and Key Account Managers with external customers (see appendix).

Vital exhaustion

Vital exhaustion was measured with the nine-item short form of the Maastricht Vital Exhaustion Questionnaire (Kopp, et al., 1998) and the validated German version (Kudielka, et al., 2006; Schnorpfeil, et al., 2002).

Depression

In waves 1 and 2, we surveyed psychosomatic disorders with the help of the Brief Symptom Inventory (Derogatis, 1995; Franke, 2002), which we used as an ‚all-in-one inventory‘ at the beginning of the study to investigate the need for using scales in addition to a scale for depression in waves 3, 4, and 5. We report results solely for the subscale ‚depression‘ in the Brief Symptom Inventory. To measure depression in waves 3-5, we used the Patient Health Questionnaire PHQ-9 (Kroenke, Spitzer, & Williams, 2001; Pfitzer Inc., 2005), which is suitable for screening for possible depression

or depressive mood (Couser, 2008; Williams, Noel, Cordes, Ramirez, & Pignone, 2002).

Effort-reward imbalance and overcommitment

Effort-reward imbalance and overcommitment were assessed using the English versions of the five-item effort scale (without the item that measured ‚physical effort‘), the 11-item reward scale, and the six-item scale for overcommitment in the ERI model (Siegrist, et al., 2004). For the parallel survey, we used the validated German versions of these scales (Rödel, Siegrist, Hessel, & Brähler, 2004).

Rest and recovery

A new short inventory comprised easily interpretable items that differentiated between private life (at daily and working-week levels) and work (presence / absence, usability, and actual use of options for rest and recovery). The work-related scale assesses three potentially different aspects that the company could consider in their improvement programme (see appendix). We did not include items that concerned detachment from work because we thought that this is already assessed adequately by the overcommitment scale in the ERI model. The four-item Jenkins Sleep Questionnaire was used to measure sleep problems (Jenkins, et al., 1988; Kudielka, et al., 2004).

Social support

The items were chosen from the results of a meta-analysis that confirmed two main types of social support: emotional and instrumental (Schwarzer & Lepkin, 1991). Sources of social support were defined as the supervisor, colleagues, partner and family, and friends. Our scales for sources of social support integrated the types of support, and the accessibility and availability of all sources of support in a score for each source (see appendix).

Organisational analysis

A factor analysis with varimax rotation of the items in our initial survey revealed seven factors with very good psychometric properties (work in progress). In this context, we focused solely on work strain and the match of a person’s skills, abilities, and personality with their work, and a one-item scale for work satisfaction (see also Nagy, 2002) (see appendix).

Health and impaired activity

Many widely used scales comprise a rather eclectic mixture of items with heterogeneous answer formats and rating periods, and have been criticised on all these counts (Brazier & Deverill, 1999; Brazier & Roberts, 2004; Brazier, Roberts, Tsuchiya, & Busschbach, 2004). In addition to these shortcomings, these scales were inappropriate for use in our study for two further rea-

sons. First, most scales characterize health and health impairments on the basis of questions on a set of specific health problems, such as pain or having problems climbing stairs. We wished to provide a general characterisation of an individual's state of health, without reporting specific problems. Second, the most widely used scales are commercial inventories, whereas we wanted to provide results that are based primarily on inventories that have no restrictions on use.

Instead of using one of the widely used scales, we followed Knäuper and Turner, who in turn followed current scientific trends in holding that individuals are able to provide valuable overall information on their health (mental and physical) and the performance of daily tasks (Brazier & Deverill, 1999; Knäuper & Turner, 2005). Consequently, our scales ask directly for self-reported general, physical and mental health, and self-reported impairments in the work and private domains with the smallest possible set of items with one overall rating per aspect each (see appendix).

Sport and exercise

Most high-effort sporting activities use at least 1.5 times as much energy (metabolic equivalents, METs) as moderate-effort activities (Ainsworth, et al., 2000). For the time score, we summed up the time spent on high-effort (multiplied by the correction factor of 1.5) and moderate-effort activities. We did not sum up frequencies of high-effort and moderate-effort physical activity with a correction factor because published recommendations address intensity-independent frequencies (Bouchard, et al., 2007; Haskell, 2007; Haskell, et al., 2007; U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2005) (see appendix).

Control variables

The sample size did not allow specific analyses of the data for age groups, gender, and language. Family status (married, divorced, single, partnership) is a potential confounding factor and is also factored out in the respective analyses (Bekker, Croon, & Bressers, 2005; Wang, et al., 2011).

2.5 Statistical analyses

To take into account repeated measurements, we used hierarchical regression models to assess possible predictors of changes in the results for burnout, vital exhaustion, and depression scales, as well as of changes in the results for organisation- and person-related scales (Twisk, 2006). Given that an ordinary multiple regression model assumes that all measurements are independent of each other, the confidence intervals and P-values produced by such models are too narrow when the data contain repeated measurements. The

changes observed between the measurements at time t and measurements at time $t + 1$ served as outcomes. Positive values of change denoted an increase in the scale from year t to year $t + 1$, whereas negative values denoted a decrease. In the first analysis, we considered baseline values at time t for the burnout, exhaustion, and depression scales as outcomes. In a second series of models, we considered the baseline values at time t for the organisation- and person-related scales as possible predictors. All models were adjusted for the language of the survey (English, German), age, gender, and marital status (married, divorced, single, partnership).

Hierarchical regression models were also used to assess whether or not there was a trend over all waves. P-values below 0.05 were considered statistically significant and the corresponding predictors were included in the models. All tests were two-sided. We used R 2.12.2 for all analyses (R-project, 2011).

3 Results

Table 1 shows good response rates of more than 50 % for all waves and less satisfying repeat response rates of from 12 % to 29 % from wave to wave. Some of the participants lost or forgot their login data between waves. Due to the privacy policy of the company and the strictly anonymous assessment procedure, the authors were not able to restore personal login data. However, affected participants could start again in all waves with new login data. It may be assumed that the actual repeater rates were substantially higher than the repeater rates that were technically approved by the number of reused login data.

Cronbach's alpha was used to assess the reliability of the scales. Table 2 shows the scores for all scales used in waves 1 and 2. All scales of the Maslach Inventory and the depression scale of the Brief Symptom Inventory showed good reliability for the German subsample, and the exhaustion scale of the Maslach Inventory showed good reliability for both subsamples. Most scales were poorer for the English data set, which might be a result of the small size of the subsample and small standard deviations. In light of this, we do not refer to results for scale reliabilities in the English subsample. Table 3 shows the alpha scores for waves 3-5, in which the Maslach Inventory was discontinued and the Patient Health Questionnaire PHQ-9 scale for depression replaced the Brief Symptom Inventory scale for depression. Except for the scales for recovery, which were introduced in wave 2, all other scales were used in all waves. Both the personal burnout and client-related burnout scales of the Copenhagen Inventory showed good or very good reliability in all waves,

Table 2: Cronbach's alpha, means, and standard deviations for scales used in waves 1 and 2.

Year	2006				2007			
Language	German		English		German		English	
N	95		8		120		18	
	α	M (SD)						
MBIEXH	.911	2.6 (1.5)	.865	2.2 (1.4)	.898	2.2 (1.2)	.908	1.8 (1.1)
MBIPAC	.781	1.4 (0.8)	.694	1.0 (0.6)	.807	1.3 (0.8)	.736	1.1 (0.6)
MBIDEP	.795	2.0 (1.2)	.635	1.4 (0.8)	.853	1.6 (1.2)	.851	1.3 (1.2)
CBIWRK	.641	37.5 (13.6)	.556	32.6 (13.1)	.757	35.0 (15.2)	.463	29.8 (10.3)
CBIPER	.907	38.1 (20.6)	.795	27.6 (14.8)	.904	33.6 (19.6)	.900	25.7 (18.4)
CBICLI	.889	25.5 (18.4)	.961	25.5 (24.5)	.908	23.8 (19.4)	.910	20.4 (19.6)
VE	.867	8.5 (5.5)	.787	5.1 (4.3)	.844	6.5 (5.1)	.647	3.2 (3.1)
BSIDEP	.894	0.5 (0.7)	.586	0.5 (0.5)	.832	0.4 (0.5)	.775	0.4 (0.4)
ERIEFF	.855	18.1 (4.7)	.537	19.5 (3.5)	.750	15.7 (4.2)	.828	16.3 (4.2)
ERIREW	.837	38.5 (7.5)	.920	41.8 (9.0)	.840	39.5 (7.6)	.809	40.9 (6.8)
OC	.825	13.4 (4.1)	.867	14.2 (4.5)	.782	11.4 (3.7)	.714	12.7 (3.4)
RECWRK					.787	1.7 (0.7)	.772	1.7 (0.7)
RECPRV					.820	2.8 (0.8)	.768	2.8 (0.8)
JSQ	.852	1.6 (1.2)	.797	1.2 (1.0)	.832	1.2 (1.1)	.652	0.7 (0.6)
SSCOL	.886	2.7 (0.8)	.815	2.7 (0.6)	.891	2.9 (0.9)	.880	2.9 (0.9)
SSSUP	.902	2.2 (1.0)	.724	2.3 (0.6)	.927	2.7 (1.0)	.900	2.8 (0.8)
SSFAM	.945	3.3 (0.9)	.955	3.0 (0.8)	.914	3.3 (0.8)	.955	3.0 (1.1)
SSFRI	.865	3.0 (0.7)	.907	2.4 (1.0)	.891	3.2 (0.7)	.920	3.0 (1.0)
MATCH	.906	2.9 (0.8)	.962	3.5 (0.7)	.888	2.9 (0.8)	.777	2.9 (0.6)
STRAIN	.823	2.2 (0.9)	.885	1.8 (1.0)	.778	2.6 (0.8)	.778	2.4 (0.8)

Note: Values are not shown where an inventory was not used in the respective wave; MBIEXH, MBIPAC, MBIDEP: Maslach Burnout Inventory exhaustion, personal accomplishment, and depersonalisation scales; CBIWRK, CBIPER, CBICLI: Copenhagen Burnout Inventory work-related, personal, and client-related burnout scales; VE: vital exhaustion scale; BSIDEP: Depression scale from the Brief Symptom Inventory; ERIEFF, ERIREW, OC: effort-reward imbalance, effort, reward, and overcommitment scales; RECWRK, RECPRV: recovery scales in the work and private context; JSQ: Jenkins Sleep Questionnaire; SSCOL, SSSUP, SSFAM, SSFRI: scales for support by colleagues, supervisor, family, and friends; MATCH, STRAIN: organisational person-work match and work strain scales.

as did the scale for work-related burnout in waves 4 and 5. The Maastricht Vital Exhaustion Questionnaire, the Patient Health Questionnaire PHQ-9 and the Jenkins Sleep Questionnaire showed good reliability in all waves. All three aspects of the ERI model showed good or very good reliability.

The new scales for recovery showed satisfying or good reliability in all waves. The social support scales showed good or very good reliability, person-work match, work strain, self-reported health, and health impairments showed consistently good alpha values.

Table 3: Cronbach's alpha, means, and standard deviations for scales in waves 3 to 5.

Year	2008				2009				2010			
Language	German		English		German		English		German		English	
N	121		15		126		25		106		11	
	α	M (SD)										
CBIWRK	.728	36.8 (14.5)	.560	30.4 (11.0)	.865	27.5 (17.7)	.769	26.0 (15.3)	.859	31.8 (17.1)	.847	25.5 (19.8)
CBIPER	.916	40.1 (20.1)	.915	34.1 (20.5)	.895	35.7 (29.8)	.912	34.2 (21.7)	.878	37.5 (18.5)	.901	55.7 (21.5)
CBICLI	.881	25.5 (17.2)	.901	20.3 (17.4)	.882	18.5 (16.8)	.917	19.8 (21.5)	.894	22.5 (18.5)	.954	31.8 (19.9)
VE	.858	6.7 (5.2)	.896	4.9 (5.5)	.841	5.4 (4.9)	.792	5.2 (4.5)	.848	6.5 (5.2)	.888	10.8 (5.2)
PHQ-9	.875	4.8 (4.5)	.840	5.7 (4.4)	.851	5.4 (3.4)	.950	5.3 (5.2)	.795	4.0 (3.5)	.745	5.4 (3.9)
ERIEFF	.850	15.0 (4.0)	.724	12.5 (3.4)	.866	12.2 (4.5)	.770	12.2 (5.5)	.817	15.2 (4.0)	.856	15.7 (3.6)
ERIREW	.856	45.5 (7.7)	.911	45.7 (8.2)	.895	47.5 (8.2)	.949	46.6 (10.5)	.897	46.2 (8.6)	.921	58.1 (11.5)
OC	.825	11.7 (5.6)	.881	15.4 (4.8)	.728	11.5 (3.4)	.780	15.9 (5.7)	.727	11.6 (3.5)	.596	16.8 (3.5)
RECWRK	.745	1.7 (0.7)	.848	1.9 (0.9)	.859	1.8 (0.8)	.705	2.0 (0.7)	.818	1.7 (0.8)	.751	1.9 (0.7)
RECPRV	.809	2.8 (0.7)	.722	2.9 (0.7)	.782	2.9 (0.7)	.749	2.8 (0.7)	.807	2.8 (0.7)	.750	2.1 (0.7)
JSQ	.825	1.2 (1.1)	.906	1.0 (1.1)	.825	1.0 (1.0)	.779	1.1 (1.0)	.770	1.0 (1.0)	.752	1.5 (1.2)
SSCOL	.879	2.6 (0.9)	.884	5.0 (0.8)	.905	2.9 (0.8)	.777	2.8 (1.0)	.881	2.6 (0.8)	.792	3.2 (0.5)
SSSUP	.909	2.4 (0.9)	.845	2.8 (0.7)	.920	2.6 (1.0)	.796	2.7 (1.1)	.895	2.4 (0.9)	.916	2.5 (1.1)
SSFAM	.937	3.3 (0.9)	.959	3.1 (1.1)	.952	3.4 (0.8)	.846	3.2 (1.1)	.916	3.4 (0.8)	.910	3.4 (0.7)
SSFRI	.909	3.0 (0.9)	.965	3.1 (0.9)	.925	3.2 (0.8)	.851	3.0 (1.1)	.909	3.1 (0.8)	.959	3.4 (0.5)
MATCH	.928	2.8 (0.9)	.854	2.7 (0.7)	.926	2.9 (0.9)	.887	2.9 (0.9)	.904	2.8 (0.8)	.854	2.0 (0.8)
STRAIN	.859	2.6 (0.9)	.860	2.5 (0.9)	.805	2.7 (0.8)	.878	2.9 (0.7)	.775	2.5 (0.8)	.629	2.2 (0.7)
HLTH	.891	4.5 (1.0)	.858	4.4 (0.9)	.859	4.7 (0.9)	.794	4.7 (0.8)	.871	4.8 (1.0)	.953	4.1 (1.1)
IMP	.900	14.9 (19.5)	.908	25.0 (28.0)	.869	11.2 (16.6)	.964	21.2 (27.7)	.868	12.7 (17.7)	.910	40.9 (25.3)

Note: CBIWRK, CBIPER, CBICLI: Copenhagen Burnout Inventory work-related, personal, and client-related burnout scales; VE: vital exhaustion scale; PHQ-9: Patient Health Questionnaire, depression scale; ERIEFF, ERIREW, OC: effort-reward imbalance, effort, reward, and overcommitment; RECWRK, RECPRV: recovery scales in the work and private context; JSQ: Jenkins Sleep Questionnaire; SSCOL, SSSUP, SSFAM, SSFRI: scales for support by colleagues, supervisor, family, and friends; MATCH, STRAIN: organisational person-work match and work strain scales; HLTH, IMP: health and health-related impairment scales.

The results were as follows. We found a significant favourable decrease over all waves for work-related burnout in the Copenhagen Inventory (-1.22 per year, $t_{146} = -2.77$), the gratification index in the ERI model (-0.10 per year, $t_{146} = -9.77$) and sleep problems in the Jenkins Sleep Questionnaire (-0.10 per year, $t_{146} = -3.59$). There was a significant positive decrease for

exhaustion in the Maslach Inventory from wave 1 to wave 2 (-0.39, $t_{16} = -2.71$). The frequency of physical activity increased significantly, by an average of 0.34 incidences per year, over all waves ($t_{146} = 4.56$), and the duration of physical activity increased significantly by an average of 35 minutes per year ($t_{146} = 6.99$).

Table 4: Correlations for all scales in all waves.

Scale	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1 MBIEXH	.19*	.62**	.75***	.74***	.51***	.71***	.55***	-.40***	.60***	-.50***	.60***	-.34***	.60***	-.34***	-.56***	-.27***	-.34***	-.21***	-.54***	-.37***	-.37***	-	-	-.25***	-.22***
2 MBIPAC	-	.57**	.55***	.24***	.25***	.51***	.24***	-.18**	.22***	.22***	-.14	-.25**	.25***	-.17**	-.25***	-.13*	-.18**	-.54***	-.21***	-.45***	-.45***	-	-	-.10	-.04
3 MBIDEP	-	.64***	.54***	.54***	.54***	.57***	.57***	-.58***	.38***	.38***	-.22**	-.44***	.45***	-.42***	-.50***	-.17**	-.25***	-.50***	-.59***	-.59***	-.59***	-	-	-.16*	-.18**
4 CBIWRK	-	.78***	.65***	.74***	.65***	.74***	.59***	.66***	.55***	.58***	-.37***	-.49***	.55***	-.51***	-.45***	-.19***	-.25***	-.59***	-.48***	-.54***	-.53***	-.53***	-.29***	-.18***	-.15***
5 CBIWER	-	.47***	.80***	.62***	.69***	.69***	.69***	.69***	.57***	.57***	-.57***	-.60***	.59***	-.25***	-.54***	-.22***	-.25***	-.28***	-.40***	-.39***	-.60***	-.60***	.51***	-.27***	-.22***
6 CBICLI	-	.49***	.45***	.45***	.45***	.45***	.46***	.46***	.45***	.45***	-.20***	-.55***	.54***	-.41***	-.44***	-.18***	-.21***	-.57***	-.57***	-.50***	-.41***	-.41***	.21***	-.07	-.06
7 VE	-	.58***	.72***	.48***	.59***	.59***	.48***	.48***	.59***	.59***	-.50***	-.57***	.73***	-.24***	-.56***	-.25***	-.28***	-.52***	-.41***	-.42***	-.60***	-.60***	.53***	-.22***	-.21***
8 BSIDEPE	-	.47***	.44***	.44***	.44***	.44***	.44***	.44***	.48***	.48***	-.22**	-.51***	.48***	-.24***	-.51***	-.36***	-.54***	-.22	-.52***	-.32***	-.31***	-	-	-.25***	-.26***
9 PHQ-9	-	.47***	.44***	.44***	.44***	.44***	.44***	.44***	.44***	.44***	-.29***	-.50***	.64***	-.27***	-.52***	-.26***	-.25***	-.50***	-.52***	-.47***	-.47***	-.62***	.40***	-.20***	-.19***
10 GI	-	.54***	.52***	.52***	.52***	.52***	.52***	.52***	.54***	.54***	-.52***	-.59***	.56***	-.25***	-.41***	-.08*	-.13***	-.2***	-.55***	-.37***	-.53***	-.53***	.21***	-.12**	-.16***
11 OC	-	.50***	.48***	.48***	.48***	.48***	.48***	.48***	.48***	.48***	-.50***	-.48***	.51***	-.19***	-.26***	-.12**	-.19***	-.15***	-.52***	-.50***	-.53***	-.53***	.20***	-.17***	-.15***
12 RECWRK	-	.55***	.25***	.25***	.25***	.25***	.25***	.25***	.55***	.55***	-.25***	-.25***	.20***	-.27***	.27***	.06	.15***	.13**	.56***	.26***	.25***	-.25***	-.06	.24***	.16***
15 RECPRV	-	.44***	.21***	.21***	.21***	.21***	.21***	.21***	.44***	.44***	-.44***	-.44***	.21***	-.28***	.28***	.22***	.24***	.25***	.56***	.52***	.50***	-.26***	-.22***	.24***	.24***
14 JSQ	-	.16***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	.16***	.16***	-.16***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***	-.26***
15 SSCOL	-	.61***	.40***	.40***	.40***	.40***	.40***	.40***	.61***	.61***	-.61***	-.40***	.40***	-.61***	.40***	.40***	.50***	.20***	.25***	.51***	.25***	-.25***	-.09	.10**	.07
16 SSSUP	-	.50***	.36***	.36***	.36***	.36***	.36***	.36***	.50***	.50***	-.50***	-.36***	.36***	-.50***	.36***	.36***	.52***	.52***	.54***	.45***	.27***	-.27***	-.10*	.09*	.08*
17 SSFAM	-	.67***	.09*	.09*	.09*	.09*	.09*	.09*	.67***	.67***	-.67***	-.09*	.09*	-.67***	.09*	.09*	.09*	.09*	.10**	.09*	.26***	-.18***	.06	.10*	.10*
18 SSFRI	-	.12**	.15***	.15***	.15***	.15***	.15***	.15***	.12**	.12**	-.12**	-.15***	.15***	-.12**	.15***	.15***	.15***	.15***	.16***	.16***	.25***	-.16***	.15***	.17***	.17***
19 MATCH	-	.22***	.75***	.75***	.75***	.75***	.75***	.75***	.22***	.22***	-.22***	-.75***	.75***	-.22***	.75***	.75***	.75***	.75***	.27***	.27***	.27***	-.15**	.06	.05	.05
20 STRAIN	-	.45***	.24***	.24***	.24***	.24***	.24***	.24***	.45***	.45***	-.45***	-.24***	.24***	-.45***	.24***	.24***	.24***	.24***	.24***	.24***	.24***	-.17***	.16***	.09*	.09*
21 SAT	-	.57***	.20***	.20***	.20***	.20***	.20***	.20***	.57***	.57***	-.57***	-.20***	.20***	-.57***	.20***	.20***	.20***	.20***	.20***	.20***	.20***	-.20***	.10*	.07	.07
22 HLTH	-	.58***	.26***	.26***	.26***	.26***	.26***	.26***	.58***	.58***	-.58***	-.26***	.26***	-.58***	.26***	.26***	.26***	.26***	.26***	.26***	.26***	-.58***	.26***	.26***	.26***
23 IMP	-	.47***	.16***	.16***	.16***	.16***	.16***	.16***	.47***	.47***	-.47***	-.16***	.16***	-.47***	.16***	.16***	.16***	.16***	.16***	.16***	.16***	-.16***	.16***	.16***	.16***
24 PAFRQ	-	.64***	.26***	.26***	.26***	.26***	.26***	.26***	.64***	.64***	-.64***	-.26***	.26***	-.64***	.26***	.26***	.26***	.26***	.26***	.26***	.26***	-.26***	.26***	.26***	.26***
25 PADUR	-	.64***	.26***	.26***	.26***	.26***	.26***	.26***	.64***	.64***	-.64***	-.26***	.26***	-.64***	.26***	.26***	.26***	.26***	.26***	.26***	.26***	-.26***	.26***	.26***	.26***

Note: N = 654; fields without correlations are due to nonsimultaneous application of the respective scales; MBIEXH, MBIPAC, MBIDEP: Maslach Burnout Inventory exhaustion, personal accomplishment, and depersonalisation scales; CBIWRK, CBIWER, CBICLI: Copenhagen Burnout Inventory work-related, personal, and client-related burnout scales; VE: vital exhaustion scale; BSIDEPE: depression scale from the Brief Symptom Inventory; PHQ-9: Patient Health Questionnaire, depression scale; GI, OC: effort-reward imbalance, gratification index and overcommitment scale; RECWRK, RECPRV: recovery scales in the work and private context; JSQ: Jenkins Sleep Questionnaire; SSCOL, SSSUP, SSFAM, SSFRI: scales for support by colleagues, supervisor, family, and friends; MATCH, STRAIN: organisational person-work match and work strain scales; SAT: overall work satisfaction item; HLTH, IMP: health and health-related impairment scales; PAFRQ, PADUR: health behaviour scales for the frequency and duration of physical activity; control variables: survey language (English, German), age, gender, family status (married, divorced, single, partnership), * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Table 4 shows the correlations among the 25 scales over all waves for all participants.

We found significant correlations in the results between the scales for various factors. Exhaustion on the Maslach Inventory (waves 1 and 2) was correlated highly with personal and work-related burnout on the Copenhagen Inventory, and with vital exhaustion, as measured by the Maastricht Vital Exhaustion Questionnaire. We also found plausible correlations between exhaustion on the Maslach Inventory and depression in the Brief Symptom Inventory, overcommitment, recovery in the personal area, and sleep problems. The gratification index in the ERI model, social support, and recovery in the work-related area showed comparably low but still substantial correlations with exhaustion in the Maslach Inventory. Personal accomplishment was correlated more strongly with exhaustion in the Maslach Inventory and with work satisfaction than with factors measured by any of the other scales. Depersonalisation in the Maslach Inventory showed high correlations with all factors measured by the scales in the Copenhagen Inventory, with depression in the Brief Symptoms Inventory and vital exhaustion, and higher correlations with person-work match and work satisfaction. We also found plausible medium-sized correlations for depersonalisation with work-related support, but much weaker correlations with support from personal sources.

The Copenhagen Inventory showed higher correlations between the factors it measures than the Maslach Inventory. Both personal burnout and work-related burnout in the Copenhagen Inventory showed substantial correlations with (a) vital exhaustion, and (b) depression in the Brief Symptom Inventory and in the PHQ-9. In comparison, client-related burnout in the Copenhagen Inventory showed weaker correlations than personal burnout and work-related burnout with vital exhaustion and depression (on both scales) but a higher correlation with social support from colleagues. Also on the Copenhagen Inventory, supervisor support was related plausibly to both work-related ($r = -0.45$) and client-related burnout ($r = -0.41$) but less strongly to personal burnout ($r = -0.34$). Interestingly, support from family / partner and friends seemed to affect burnout less than supervisor support; this pattern was consistent for the Maslach Inventory, the Copenhagen Inventory, and vital exhaustion. Unsurprisingly, recovery in personal life was correlated strongly with personal burnout and showed a slightly lower correlation with work-related burnout. Recovery in the work context was correlated only moderately ($r = -0.37$) with personal and work-related burnout and was correlated hardly at all with client-related burnout. Self-reported health was associated substantially with work-related and personal burnout and slightly more weakly with client-related burnout. The associations of the factors

measured by the Copenhagen Inventory scales with self-reported health impairments were comparably weaker but remained significant. The correlations between overcommitment and the factors measured by the Copenhagen Inventory scales were consistently high. However, for the gratification index, the correlations were high for the work- and client-related burnout scales and slightly lower for personal burnout.

The scale that measures vital exhaustion integrates items that concern sleep, exhaustion, and states that indicate depression. Unsurprisingly, scores for vital exhaustion showed high correlations with those for depression on both scales, sleep problems, and self-reported health. Moreover, high scores for vital exhaustion indicated a much-reduced degree of recovery in the private domain ($r = -0.57$).

High scores for depression on the Brief Symptom Inventory and the Patient Health Questionnaire PHQ-9 were associated with reduced recovery in the private domain and reduced quality of sleep. The results for the PHQ-9 were also highly correlated with self-reported health and showed the highest correlation with health impairments. Scores for self-reported health were correlated strongly with those for quality of sleep ($r = -0.51$) and with recovery in the private domain ($r = 0.50$).

The better the person-work match, the lower were the scores for burnout and depression. This association was lower for exhaustion in the Maslach Inventory than for the other burnout scales, and lower for depression as measured by the scale in the Brief Symptom Inventory than for depression as measured by the scale in the Patient Health Questionnaire PHQ-9. Work strain was correlated moderately with burnout and depression on scales that measured them, with the exception of personal accomplishment. Lower scores on all scales that measured burnout accompanied higher scores for work satisfaction.

Physical activity was associated much less strongly with the results of scales that measured burnout, vital exhaustion, and depression than those of the other above-mentioned scales. Nevertheless, we did find small but significant associations: physically active managers scored slightly lower than physically inactive managers for exhaustion on the Maslach Inventory, work-related and personal burnout on the Copenhagen Inventory, and vital exhaustion. These managers reported slightly better recovery in both work and private areas, and had slightly better self-reported health than less active managers. Frequency and duration of activity were highly correlated; consequently, they showed comparable associations with other factors.

Table 5 shows the results of multilevel regression models that were based on data on burnout, depression, and vital exhaustion. Here, the predictors are also outcome variables. For all the Copenhagen Inventory scales and vital exhaustion, we found a significant decline between assessments: the higher the baseline value, the greater the decline in the respective scale. The scores for depression in the Patient Health Questionnaire PHQ-9 also declined over time with respect to themselves but increased with respect to work-related and client-related burnout.

Table 6 shows the results from hierarchical regression models, in which it may be assumed with some plausibility that many of the predictors can be influenced by personnel development, organisational development or changes in personal behaviour. Work strain had the most apparent effect over time on burnout, vital exhaustion, and depression. Nevertheless, this pattern was not consistent for the results for all scales for burnout and depression, and the t values were small. Higher scores for work strain at time t_1 resulted in significantly greater changes in personal and work-related burnout, vital exhaustion, and depression. The results for the subscales of the social support model showed several significant relationships with the results for depression in the Brief Symptom Inventory and personal accomplishment. Supervisor support had a beneficial effect, whereas family support had an implausible detrimental effect, on depression. Colleague support affected beneficially personal accomplishment in the Maslach Inventory. Increases in the severity of sleep problems at time t_1 were accompanied by less vital exhaustion and reduced depression as measured by the Patient Health Questionnaire PHQ-9, and greater exhaustion on the Maslach Inventory. Higher degrees of gratification as measured by the gratification index were associated with reduced depression as measured by the Brief Symptom Inventory.

In summary, only the scale for work strain made a plausible and significant contribution to explaining changes in burnout and depression.

4 Discussion

To our knowledge, the study reported herein is the first to investigate (a) overlaps between scores for the factors studied and the results yielded by the Copenhagen and Maslach Inventories, and (b) scores for vital exhaustion and depression in managers. The simultaneous measurement of all the factors in a single study underlines the validity and importance of the results.

We now discuss the intraperiod and interperiod associations among factors, address specific aspects of

Table 5: Results from hierarchical regression models predicting changes in burnout, exhaustion, and depression scales.

Variable	CBIWVRK		CBIWVRK		CBIWVRK		CBIWVRK		CBIWVRK		CBIWVRK		CBIWVRK		CBIWVRK		CBIWVRK		CBIWVRK		
	β	t	β	t	β	t	β	t	β	t	β	t	β	t	β	t	β	t	β	t	
CBIWVRK	-0.57***	-6.80	-1.04***	-6.24		18															
CBIWVRK																					
CBIWVRK																					
VE																					
BSIDEP																					
PHQ-9																					
MBXIEHX																					
MBIPAC																					
MBIDPE																					
N																					

Note: Calculation of differences: Value at $t + 1$ - value at t ; MBIEHX, MBIPAC, MBIDPE: Maslach Burnout Inventory exhaustion, personal accomplishment, and depersonalisation scales; CBIWVRK, CBIWVRK, CBIWVRK: Copenhagen Burnout Inventory work-related, personal, and client-related burnout scales; VE: vital exhaustion scale; BSIDEP: depression scale from the Brief Symptom Inventory; PHQ-9: Patient Health Questionnaire, depression scale; control variables: survey language (English, German), age, gender, family status (married, divorced, single, partnership); * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Table 6: Results from hierarchical regression models predicting changes in organisation- and person-related scales.

Variable	CBIPER		CBIWRK		CBICLI		VE		BSIDEP		PHQ-9		MBIEXH		MBIPAC		MBIDPE	
	β	t	β	t	β	t	β	t	β	t	β	t	β	t	β	t	β	t
GI							0.56**	3.59	9									
OC																		
JSQ					-1.00*	-2.18	42											
SSUP																		
SSCOL																		
SSFAM																		
SSFRI																		
RECPV																		
RECWRK																		
MATCH																		
STRAIN	7.42***	-5.20	45	5.55**	-2.55	45	1.56*	2.55	42	0.35*	2.92	9	0.88**	3.20	11			
PAFRQ																		
PADUR																		
N		120		120		120		120		17		75		17		17		17

Note: MBIEXH, MBIPAC, MBIDPE: Maslach Burnout Inventory exhaustion, personal accomplishment, and depersonalisation scales; CBIWRK, CBIPER, CBICLI: Copenhagen Burnout Inventory work-related, personal, and client-related burnout scales; VE: vital exhaustion scale; BSIDEP: depression scale from the Brief Symptom Inventory; PHQ-9: Patient Health Questionnaire, depression scale; GI, OC: effort-reward imbalance, gratification index and overcommitment scale; RECWRK, RECPV: recovery scales in the work and private context; JSQ: Jenkins Sleep Questionnaire; SSCOL, SSSUP, SSFAM, SSFRI: scales for support by colleagues, supervisor, family, and friends; MATCH, STRAIN: organisational person-work match and work strain scales; SAT: overall work satisfaction item; HLTH, IMP: health and health-related impairment scales; PAFRQ, PADUR: health behaviour scales for the frequency and duration of physical activity; control variables: survey language (English, German), age, gender, family status (married, divorced, single, partnership); * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

the Copenhagen Inventory, present limitations of the study, and consider how our results can be used to improve practical interventions to reduce burnout.

4.1 *Intraperiod associations*

The correlations between results for burnout, depression, and vital exhaustion are high within the waves, no matter what scales are used. This finding supports no definite conclusion. To some extent, the correlations can be explained by similarity in the items in the scales, but this merely pushes the problem back a step: why are the items similar? Three possibilities suggest themselves: (i) the scales measure the same construct; (ii) the scales are faulty in that the constructs differ and there is a conceptual mismatch between the construct and the items that are chosen to measure it; and (iii) the scales contain items that are reliable indicators of the presence of a phenomenon and each construct has the same indicators, but these indicators do not form part of the definition of the construct. A further possibility is that, irrespective of the similarity in items, the scales measure different constructs but that the correlations point to causal connections between or underlying them. Further work is needed to resolve these issues.

Work-related and personal burnout on the Copenhagen Inventory were highly correlated (see also Borritz, et al., 2005; Yeh, Cheng, Chen, Hu, & Kristensen, 2007). However, we do not think that when studying burnout it is sufficient to study either one of these dimensions and neglect the other. Although work-related and personal burnout may have the same symptoms, their causes will likely differ. Thus, the result highlights the need to identify what is responsible for the correlation. In addition to the scientific benefits of considering the dimensions as different, using separate measures for burnout in the work-related, client-related, and personal-related areas has a significant practical benefit. The various measures provide important information that can be used when formulating strategies for providing aftercare to sufferers from burnout. For example, people who like their work but suffer from severe stress when interacting with clients or customers might have been placed in the wrong job or need training, whereas people who are suffering from work-related burnout, in particular, may derive satisfaction from interacting with clients or customers but rarely have the opportunity to do so. The Maslach Inventory offers neither the scientific nor the practical benefits afforded by the Copenhagen Inventory.

Exhaustion in the Maslach Inventory and the scales of the Copenhagen Inventory are highly correlated. The Maslach Inventory contains a single, general scale for exhaustion, which might be sufficient in some studies. The Copenhagen Inventory offers a

more detailed analysis of exhaustion in the work and personal domains: this was considered an advantage by the HR department of the company that we studied.

The extent to which an individual was able to recover in the private domain was correlated strongly with the severity of both personal burnout and work-related burnout. This finding supports recent recommendations for research on burnout, such that a perspective be included that captures factors from the private domain (e.g. Bekker, et al., 2005; Sonnentag, 2005). Even though a time-lagged association was not observed, our results warrant further investigation to determine whether or not rest and recovery on the one hand, and burnout on the other, are causally connected, and if so, exactly what those connections are (see also Hahn, Binnewies, Sonnentag, & Mojza, 2011). The significant correlation of $r = -0.57$ between work-related burnout and recovery in the work domain also warrants investigation of the role that rest and recovery play in that domain.

Both overcommitment and the gratification index were highly correlated with all factors measured by the Copenhagen Inventory, with a lower correlation between the gratification index and personal burnout than between overcommitment and personal burnout. This difference in the degree of correlation may be explained as follows. The scale for overcommitment measures the inability to unwind from work in private life. We should expect this inability to act as a stressor in private life, which will result in high scores for personal burnout. In contrast, the gratification index reflects the balance of effort and reward in the work setting, and while we should expect the level of satisfaction with the reward that one receives for one's work to have a bearing on the level of satisfaction in one's personal life, it is feasible that low gratification should affect personal burnout less than overcommitment does.

Overcommitment is correlated strongly with rest and recovery in private life ($r = -0.48$). We take it as given that a reduced quality of rest and recovery in private life will not play a causal role in the development of overcommitment. Rather, strong overcommitment affects the quality of rest and recovery negatively. In this regard, Hahn et al. (Hahn, et al., 2011) recently reported on a quasi-experimental study on a training programme for recovery and argued that intervention programmes should address not only techniques for resting and recovering, but also factors that pertain to overcommitment. On this we agree. However, we think that overcommitment and the factor that these authors used, 'detachment from work', capture only one side of a two-sided situation. Perhaps a manager is psychologically able to detach from work, but is prevented from doing so by external factors, for example, if they are forced to be available for work over the weekend,

if necessary. In this case, the employer should rethink their demands on employees outside official working hours. On the other hand, perhaps the manager is psychologically unable to detach from work, irrespective of external factors. In this case, training to promote recovery by reducing overcommitment may help. Given the foregoing, it will be evident that training on rest and recovery for individuals will be ineffective in many cases unless the employer is willing to take steps to reduce overcommitment by changing their demands on employees. To help employers to recognise demands that make it difficult for managers to unwind, we recommend extending Sigrist's effort-reward and overcommitment model with scales that identify the existence of and measure the severity of such demands.

Physical activity, as a possible leisure-time activity, showed small but significant intraperiod, but no time-lagged, associations with burnout, vital exhaustion, and depression. Current research comprising in-progress longitudinal studies provides preliminary evidence that physical activity alleviates symptoms of depression (e.g. Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005). (The effect is likely temporary unless the causes of depression are eliminated, so the physical activity will need to form part of a regular schedule for exercise.) However, we know of no comparable studies for burnout. Given the high correlations between the incidence and severity of depression and burnout, and the significant correlations between physical activity and recovery at work and in private life, studying the effect of physical activity on burnout looks promising for the development of intervention strategies.

The intraperiod analysis showed comprehensive and high correlations between work satisfaction and (a) person-work match ($r = 0.75$) and (b) depersonalisation ($r = 0.59$). The short scale for work satisfaction estimates the satisfaction of managers with several aspects of their work, which reflects indirectly the extent of the match between their demands and the reality of the workplace (Daniels & De Jonge, 2010). Work strain was associated much less strongly with overall work satisfaction ($r = 0.45$) than the above-mentioned factors, as was even the gratification index ($r = -0.37$). These results support the conclusion of a recent meta-analysis that recommends evaluating critically the work of employees who are diagnosed as having problems that fall under the coarse-grained category „psychological“ (Faragher, Cass, & Cooper, 2005, p. 105). They also challenge companies to provide jobs that are interesting, match managers' abilities and qualifications, and require the performance of a variety of tasks. One might argue that our categorisations are invalid, in that the one-item scale for overall work satisfaction should be construed simply as part of the person-work match scale. However, such a construal

would be mistaken, in that it would conflate causes and effects; namely, an effect of a match between a manager's demands and the reality at work, i.e. overall work satisfaction, and one of many potential causes of this satisfaction, i.e. the match of work and workplace characteristics with the individual's demands.

4.2 Time-lagged associations

Scores on all the scales on the Copenhagen Inventory, the PHQ-9 depression scale, the Jenkins sleep scale, and vital exhaustion fell in successive years, which indicates ongoing improvement in the participants' condition. For work-related burnout on the Copenhagen Inventory and exhaustion on the Maslach Inventory, the sample improved even when the results for work strain remained broadly the same. What could explain this ongoing improvement? In at least partial explanation, we know that the feedback in .pfd format prompted some managers to ask for coaching on health-related factors, such as overcommitment and sleep problems, and others to resume participation in sporting activities. However, the effects of the manager's responses to feedback cannot be factored out because the study design did not allow for the control or documentation of interventions following receipt of the results. The trends on the above-mentioned scales comprise evidence that the managers' interventions affected results on all the scales simultaneously. This is plausible because the results for these scales are highly intercorrelated. The significant positive beta between the results for Jenkins' sleep scale and exhaustion on the Maslach Inventory should be interpreted with care, because of the small sample size in the respective regression models ($N = 17$).

We found significant beta values between scores on the PHQ-9 at t_i and changes in the scores for work-related and client-related burnout in the Copenhagen Inventory over time, and a nonsignificant beta value between the PHQ-9 scores at t_i and personal burnout: higher scores at baseline on the PHQ-9 were accompanied by higher increases in work-related and client-related burnout, but no changes in personal burnout. A possible explanation for the increase in work-related and client-related burnout is that managers who reach a certain level of depression experience a reduced capacity to work, which results in work overload and a reduced capability to handle the demands of interacting with clients. There are at least two possible explanations for the fact that higher scores on depression at baseline were not accompanied by changes in scores for personal burnout. (1) Ameliorating factors from the personal domain, such as social support from family and friends, may have acted as effective buffers in the connection between depression and personal burnout, whereas in the work domain ameliorating factors were

missing or less effective. (However, our sample size does not allow for an in-depth analysis of possible mediating factors in the connection between depression and burnout). (2) The action taken by the managers in response to feedback may have primarily / initially affected the scores on the personal burnout scale of the Copenhagen inventory.

With respect to whether burnout affects depression, on none of the burnout scales did baseline scores at t_1 predict changes in scores on the PHQ-9 over time. So, an increase in scores for burnout is not necessarily accompanied by an increase in scores for depression, which shows that burnout can occur independently from depression. There is thus a reason for distinguishing between burnout and depression when monitoring them in employee surveys. Such differentiation in monitoring has practical implications. It is far easier (though not inherently easy) to avoid burnout in a manager for whom burnout is impending than it is to treat extant depression. If the observed signs indicate impending burnout, immediate concrete actions to eliminate or alleviate factors that are known to play a causal role in its onset, maintenance and severity, for example, eliminating or reducing an excessive workload, can either prevent the onset of burnout, eliminate it, reduce its severity, or prevent the severity from increasing, dependent on the exact nature of the interventions.

When burnout is accompanied by undetected depression, an intervention that is effective when burnout alone is present may be less effective or even ineffective, so different interventions will be needed. Hence, effective treatment requires simultaneous screening for burnout and depression.

The correlations between work strain and (a) personal and work-related burnout on the Copenhagen Inventory, and (b) exhaustion on the Maslach Inventory showed significant beta values. In addition, when the score for work strain (range 0-4) increased by 1 point the vital exhaustion score (range 0-18) increased significantly by 1.36 points. Work strain would thus seem to be the core cause of burnout in the workplace; hence, to eliminate burnout, work strain needs to be reduced significantly. Doing so is problematic in practice. Given the constraints imposed by legal requirements to maximise returns to shareholders, companies and individual managers cannot reduce work strain easily. As a result, companies tend to focus on alleviating the symptoms of burnout. Yet this will not work. It is akin to trying to treat pneumonia merely by administering a mucolytic to reduce the symptoms of fluid discharge, which does nothing to eliminate the underlying pathogen. If companies are serious about wishing to balance performance and the maintenance of good health, it is essential that they take steps to reduce work strain.

4.3 *The Copenhagen Burnout Inventory – Generalised Version*

The Copenhagen Inventory comprises a work-related burnout scale, a client-related burnout scale, and a personal burnout scale that can indicate the degree of burnout independently from the work domain. Our adaptation of the scale for client-related burnout strengthens it by increasing its range of applicability to various types of sample without excluding interaction with clients. The Copenhagen Inventory also connects work and private life. We regard this as a critical advance in research on burnout. Burnout can originate in private life, so studies on burnout need to include scales for the personal domain as a matter of course. We introduced scales for both the work and personal domains in our new scales for social support, and rest and recovery, which enabled intra-domain and inter-domain analyses. The correlations between the results for the subscales in the Copenhagen Inventory and those for the subscales of social support show plausible correlations with different sources of support (see also Halbesleben, 2006) and support the use of separate scales for the work and personal domains in the Copenhagen Inventory. Work-related burnout and client-related burnout show slightly stronger associations with support from the supervisor and colleagues than with support from family and friends. Personal burnout shows almost equal associations with all sources of support, with a slightly higher association for supervisor support than for other sources. In general, supervisor support shows the highest associations with all burnout scales in the Copenhagen Inventory and defines a focus for personnel development. In contrast to the foregoing, the associations of the support scales with the exhaustion scale on the Maslach Inventory do not show these differences. Results from the Copenhagen Inventory provide scientific information that the Maslach Inventory cannot and offer implications for practice that the Maslach Inventory does not.

Further research will show whether the more fine-grained and differentiated structure of the Copenhagen Inventory can shed light on the causal relationships regarding burnout between and within work and private life.

5 Limitations

Our study has a number of limitations. (1) The match between constructs and measures may be faulty in two ways: the construct might not be well-defined, in which case its measure will be bound to be inaccurate, or a scale might contain items that fail to measure a well-defined construct. This problem is particularly severe for the constructs that we studied and we did

not, in light of the complexity involved, validate the match between constructs and measures. As a consequence, our discussion focuses on relationships between the measures, not on their accuracy. The problem is mitigated to some extent by the fact that some of the constructs we studied are well-defined; these serve as stable background for discussion of the others. (2) The complete set of scales introduced at baseline could not be maintained throughout the study; the decision makers in the company allowed us to use the Maslach Inventory only in waves 1 and 2, and commercial inventories were phased out in favour of inventories whose use is unrestricted. (3) The response rate of 52 % to 69 % was low and the large number of repeat completions (12 % to 29 %) of the surveys by participants imposed grave restrictions on the statistical analyses. (4) Our study design did not allow for the control or documentation of interventions following the managers' receipt of the results, so the effects of their responses to feedback cannot be factored out. (5) For reasons of simplicity, the work-strain scale does not differentiate between the number of hours worked and the amount of work that is supposed to be done in those hours. A more fine-grained scale might yield interesting results.

6 Conclusions

As noted above and as shown by its inclusion of the three mismatched factors depersonalisation, personal accomplishment and exhaustion, the Maslach Inventory is not informed by a satisfactory operational definition of burnout; hence, it cannot be regarded as a satisfactory measure of burnout. On the other hand, it can be regarded as an attempt to capture at least some of the full causal nexus of burnout. However, it has limited practical import. The Copenhagen Inventory is superior in this regard, particularly in industrial settings. It provides information that comprises a good starting point for measures in personnel and organisational development. This is particularly the case for work-related and client-related burnout, as these scales not only indicate the severity of the condition they measure, but also give preliminary information on the causes, as described above. The Copenhagen Inventory can, therefore, also bridge the gap between research and practice: if causes are identified, steps can be taken to improve the situation, for example, by implementing face-to-face counselling to refine understanding and to devise a plan of action. The execution of the plan of action, to alleviate symptoms and, preferentially, to either remove or minimise the causes, will in most cases be a cooperative task for both the individual and the employer. The help of an expert, such as a coach or

a therapist, will probably be beneficial in many cases. If an individual reports a low degree of work-related and client-related burnout but a high degree of personal burnout, the intervention strategy will still need to take into account the situation in both the work and private domains, if only to the extent that the employer is asked to offer support if and when necessary.

The discriminant validity of measures of burnout and depression requires that the scales have a minimum of semantic similarities in their items. The PHQ-9 depression scale and the Copenhagen Inventory meet this criterion; they thus constitute a useful combination of noncommercial scales for the simultaneous testing for depression and burnout (see also Shirom, 2005, p. 266).

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Scales in English and German versions

Appendix A Copenhagen Burnout Inventory - General Scale

1. Personal Burnout				
<i>Instruction</i>				
This part concerns your perception of strain. Please indicate to what extent the following statements apply to you personally.				
1. How often do you feel tired? (CBIPER01)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
2. How often are you physically exhausted? (CBIPER02)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
3. How often are you emotionally exhausted? (CBIPER03)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
4. How often do you think: 'I can't take it any more'? (CBIPER04)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
5. How often do you feel worn out? (CBIPER05)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
6. How often do you feel weak and susceptible to illness? (CBIPER06)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
2. Work-Related Burnout				
<i>Instruction</i>				
Please indicate to what extent the following types of strain occur in connection with your work.				
1. Do you feel worn out at the end of a working day? (CBIWRK01)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
2. Are you exhausted in the morning at the thought of another working day? (CBIWRK02)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
3. Do you feel that every working hour is tiring for you? (CBIWRK03)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
4. Do you have enough energy for family and friends during leisure time? (CBIWRK04)				
very often	often	sometimes	seldom	never/almost never
0	25	50	75	100
5. Is your work emotionally exhausting? (CBIWRK05)				
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree
100	75	50	25	0

6. Does your work frustrate you? (CBIWRK06)				
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree
100	75	50	25	0
7. Do you feel burnt out because of your work? (CBIWRK07)				
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree
100	75	50	25	0
5. Client-Related Burnout				
<i>Instruction</i>				
Please indicate how you feel about the contact you have with people through your work.				
1. Do you find it hard to work with the people you have contact with in the course of your work? (CBICLI01)				
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree
100	75	50	25	0
2. Does it drain your energy to work with the people you have contact with in the course of your work? (CBICLI02)				
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree
100	75	50	25	0
5. Do you find it frustrating to work with the people you have contact with in the course of your work? (CBICLI03)				
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree
100	75	50	25	0
4. Do you feel that you give more than you get back from people you have contact with in the course of your work? (CBICLI04)				
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree
100	75	50	25	0
5. Are you tired of working with the people you have contact with in the course of your work? (CBICLI05)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0
6. Do you sometimes wonder how long you will be able to continue working with the people you have contact with in the course of your work? (CBICLI06)				
very often	often	sometimes	seldom	never/almost never
100	75	50	25	0

Note. Instructions are a part of the questionnaire; original survey: Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress*, 19(3), 192-207.

Scale definitions:

- Personal burnout: $CBIPER = (CBIPER01 + CBIPER02 + CBIPER03 + CBIPER04 + CBIPER05 + CBIPER06) / 6$
- Work-related burnout: $CBIWRK = (CBIWRK01 + CBIWRK02 + CBIWRK03 + CBIWRK04 + CBIWRK05 + CBIWRK06 + CBIWRK07) / 7$
- Client-related burnout: $CBICLI = (CBICLI01 + CBICLI02 + CBICLI03 + CBICLI04 + CBICLI05 + CBICLI06) / 6$

Appendix B Recovery scales

1. Recovery at Work				
<i>Instruction</i> Here please judge your rest during working hours. Please differentiate between two aspects.				
A: <u>Possibilities</u> for rest, opportunities, freedom Examples: Your employer allows short breaks, provides a relaxation room, and offers the possibility to do sport.				
B: <u>Personal use</u> Examples: You use the possibilities for personal rest, like taking short breaks, doing sport, taking power naps.				
1. How good are the <u>possibilities</u> for rest, which are available in your working environment? (RECWRKPSB)				
very good	rather good	neutral	rather bad	very bad
4	3	2	1	0
2. How much use are you able to <u>make</u> of the possibilities for rest in your working environment? (RECWRKUTL)				
a lot	rather a lot	neutral	rather little	very little
4	3	2	1	0
3. How intensively do you <u>use</u> these possibilities for rest? (RECWRKUSE)				
very often	quite often	neutral	quite seldom	very seldom/ never
4	3	2	1	0
4. How well can you rest <u>during a typical working day</u> if necessary? (RECWRKDAY)				
very well	rather well	neutral	rather badly	very badly
4	3	2	1	0
<i>Instruction</i> The following deals with rest in the working environment generally. Please now think about the relationship between strain and rest <u>during a typical working day</u> .				
5. How good is the relationship between strain and rest here? (RECWRKALL)				
very favorable	quite favorable	neutral	rather unfavorable	very unfavorable
4	3	2	1	0
2. Private Recovery				
<i>Instruction</i> Here please judge your rest during leisure time.				
1. How well can you rest in your leisure time after a typical working day? (RECPRVAWD)				
very good	rather good	neutral	rather bad	very bad
4	3	2	1	0
2. How well can you rest in your leisure time during a typical weekend? (RECPRVWEE)				
very good	rather good	neutral	rather bad	very bad
4	3	2	1	0
<i>Instruction</i> The following deals with strain in your leisure time. Please think of all your duties, demands, chores, and obligations.				
3. How good is the relationship between strain and rest here? (RECWRKALL)				
very favorable	quite favorable	neutral	rather unfavorable	very unfavorable
4	3	2	1	0

Note. Instructions are a part of the questionnaire; underlined words help the participants to differ between the aspects.

Scale definitions:

- Recovery at work: $RECWRK = (RECWRKPSB + RECWRKUTL + RECWRKUSE + RECWRKDAY + RECWRKALL) / 5$
- Private recovery: $RECPRV = (RECPRVAWD + RECPRVWEE + RECPRVALL) / 3$ BULLET

Appendix C Social support scales

<i>Instruction</i>				
Here, you assess how satisfied you are with the social support you have received in the last 2-3 months. Please distinguish between two kinds of social support.				
A: <u>Instrumental</u> social support, for example characterized by...				
– My partner, friends, my supervisor, or colleagues offer their help when I am under pressure: with tools and materials for work, information, time...				
– Your supervisor is considerate of your private or family needs e.g. with regard to work schedules, vacation planning...				
B: <u>Emotional or cognitive</u> support, for example...				
– You receive encouragement, consolation, and motivation...				
– People listen to you, show understanding take your worries for seriously...				
1. How satisfied are you with the <u>instrumental support</u> from your...				
...colleagues? (SSINSCOL)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...supervisor? (SSINSSUP)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...family or partner? (SSINSFAM)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...friends? (SSINSFRI)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
2. How satisfied are you with the <u>emotional support</u> from your ...				
...colleagues? (SSEMOCOL)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...supervisor? (SSEMOSUP)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...family or partner? (SSEMOFAM)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...friends? (SSEMOFRI)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
3. How satisfied are you with the <u>accessibility and availability</u> of the support from your...				
...colleagues? (SSACCCOL)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...supervisor? (SSACCSUP)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...family or partner? (SSACCFAM)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
...friends? (SSACCFRI)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4

Note. Instructions are a part of the questionnaire; underlined words help the participants to differ between the aspects.

Scale definitions:

- Colleague support: SSCOL = (SSEMOCOL + SSINSCOL + SSACCCOL) / 3
- Supervisor support: SSSUP = (SSEMOSUP + SSINSSUP + SSACCSUP) / 3
- Family and partner support: SSFAM = (SSEMOFAM + SSINSFAM + SSACCFAM) / 3
- Friends support: SSFRI = (SSEMOFRI + SSINSFRI + SSACCFRI) / 3

Appendix D Organisation-related scales

1. Person-Work Match				
<i>Instruction</i>				
Please describe how satisfied you are with the following aspects of your work.				
1. How interesting my work is (MATCH01)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
2. How well my work corresponds to my abilities (MATCH02)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
3. The qualifications demanded by my work (MATCH03)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
4. Variability in my work (MATCH04)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
2. Work Strain				
1. My workload (STRAIN01)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
2. My working hours (STRAIN02)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
3. The required working pace (STRAIN03)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4
3. Work Satisfaction				
Overall satisfaction with my work (SAT)				
very dissatisfied	rather dissatisfied	neutral/half-and-half	rather satisfied	very satisfied
0	1	2	3	4

Note. Instructions are a part of the questionnaire.

Scale definitions:

- Person-Work Match: $MATCH = (MATCH01 + MATCH02 + MATCH03 + MATCH04) / 4$
- Work Strain: $STRAIN = (STRAIN01 + STRAIN02 + STRAIN03) / 3$
- Work Satisfaction: single item

Appendix E Self-reported health and health-related impairment

1. Self-Reported Health						
<i>Instruction</i> Please describe your state of health and, where applicable, health impairments arising from it.						
1. How would you judge your state of <u>health in general</u> ? (HLTHALL)						
very bad	bad	rather bad	neither good nor bad	rather good	good	very good
0	1	2	3	4	5	6
2. How would you judge your <u>mental health</u> in general? (HLTHMEN)						
very bad	bad	rather bad	neither good nor bad	rather good	good	very good
0	1	2	3	4	5	6
5. How would you judge your <u>physical health</u> in general? (HLTHPHY)						
very bad	bad	rather bad	neither good nor bad	rather good	good	very good
0	1	2	3	4	5	6
2. Health Impairment						
<i>Instruction</i> Please describe to what extent you are impaired by your state of health.						
1. To what extent does your <u>mental health</u> impair your <u>work</u> ? (IMP MENWRK)						
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree		
100	75	50	25	0		
2. To what extent does your <u>physical health</u> impair your <u>work</u> ? (IMP PHYWRK)						
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree		
100	75	50	25	0		
5. To what extent does your <u>mental health</u> impair your regular activities <u>outside your work</u> (e.g. shopping, social activities, housework...)? (IMP MENPRV)						
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree		
100	75	50	25	0		
4. To what extent does your <u>physical health</u> impair your regular activities <u>outside your work</u> (e.g. shopping, social activities, housework...)? (IMP PHYPRV)						
to a very high degree	to a high degree	somewhat	to a low degree	to a very low degree		
100	75	50	25	0		

Note. Instructions are a part of the questionnaire; underlined words help the participants to differ between the aspects.

Scale definitions:

- Self-reported health: $HLTH = (HLTHALL + HLTHMEN + HLTHPHY) / 3$
- Health-related impairment: $IMP = (IMP MENWRK + IMP PHYWRK + IMP MENPRV + IMP PHYPRV) / 4$

Appendix F Physical activity and sport

Instruction

1. If you do sport, how much high effort sport do you do in an average week?

Example: In a week at least 2 hours of activity in a fitness studio, at the weekend 1.5 hours jogging. That makes 3.5 hours altogether. In this case you should enter the figures 3 for 3 hours, and 30 minutes for half an hour of sport per week.

High Effort:

[____] hours (SPODURH) and
[____] minutes (SPODURM)

2. How often do you usually do sport per week?

[____] times (SPOCNT)

Instruction

3. How much moderate physical exercise do you do per week?

Example: Cycling, gentle swimming, intensive gardening, Nordic Walking.

Moderate Effort:

[____] hours (MODDURH) and
[____] minutes (MODDURM)

4. How often do you normally do moderate physical exercise per week?

[____] times (MODCNT)

Note. Instructions are a part of the questionnaire; underlined words help the participants to differ between the aspects.

Scale definitions:

- Scale frequency of activity: PAFRQ = (SPOCNT + MODCNT)
- Scale duration of activity: PADUR = [1.5 x (SPODURH + SPODURM) + (MODDURH + MODDURM)]; hours must be converted into minutes

Appendix G Copenhagen Burnout Inventory – Allgemeine Skala

1. Persönlicher Burnout				
<i>Instruktion</i> Hier geht es um Ihr Belastungsempfinden. Geben Sie bitte den Grad an, wie sehr die folgenden Aussagen auf Sie persönlich zutreffen.				
1. Wie oft fühlen Sie sich müde? (CBIPER01)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
2. Wie oft sind Sie körperlich erschöpft? (CBIPER02)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
3. Wie oft sind Sie emotional erschöpft? (CBIPER03)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
4. Wie oft denken Sie: „Ich halte es nicht mehr aus?“ (CBIPER04)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
5. Wie oft fühlen Sie sich ausgelaugt? (CBIPER05)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
6. Wie oft fühlen Sie sich kränklich oder anfällig für eine Erkrankung? (CBIPER06)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
2. Arbeitsbezogener Burnout				
<i>Instruktion</i> Geben Sie bitte an, in welcher Ausprägung die folgenden Belastungen im Zusammenhang mit Ihrer Arbeit auftreten.				
1. Fühlen Sie sich am Ende eines Arbeitstages ausgelaugt? (CBIWRK01)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
2. Fühlen Sie sich schon morgens beim Gedanken an einen neuen Arbeitstag erschöpft? (CBIWRK02)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
3. Empfinden Sie jede Arbeitsstunde als ermüdend? (CBIWRK03)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
4. Haben Sie genügend Energie für Familie und Freunde in Ihrer Freizeit? (CBIWRK04)				
sehr oft	oft	manchmal	selten	nie/sehr selten
0	25	50	75	100

5. Ist Ihre Arbeit emotional erschöpfend? (CBIWRK05)				
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß
100	75	50	25	0
6. Frustriert Sie Ihre Arbeit? (CBIWRK06)				
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß
100	75	50	25	0
7. Fühlen Sie sich aufgrund Ihrer Arbeit ausgebrannt? (CBIWRK07)				
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß
100	75	50	25	0
5. Klientenbezogener Burnout				
<i>Instruktion</i>				
Geben Sie bitte an, wie Sie den Umgang mit den Menschen empfinden, mit denen Sie beruflich zu tun haben.				
1. Finden Sie es schwierig mit den Menschen zusammenzuarbeiten, mit denen Sie beruflich zu tun haben? (CBICLI01)				
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß
100	75	50	25	0
2. Kostet es viel Ihrer Energie mit den Menschen zusammenzuarbeiten, mit denen Sie beruflich zu tun haben? (CBICLI02)				
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß
100	75	50	25	0
5. Frustriert Sie die Zusammenarbeit mit den Menschen, mit denen Sie beruflich zu tun haben? (CBICLI05)				
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß
100	75	50	25	0
4. Haben Sie das Gefühl, dass Sie den Menschen, mit denen Sie beruflich zu tun haben, mehr geben als Sie zurückbekommen? (CBICLI04)				
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß
100	75	50	25	0
5. Sind Sie es leid, mit den Menschen zusammenzuarbeiten, mit denen Sie beruflich zu tun haben? (CBICLI05)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0
6. Fragen Sie sich manchmal, wie lange Sie noch fähig sein werden, mit den Menschen zusammenzuarbeiten, mit denen Sie beruflich zu tun haben? (CBICLI06)				
sehr oft	oft	manchmal	selten	nie/sehr selten
100	75	50	25	0

Hinweis. Instruktionen sind Bestandteil des Fragebogens; Originalfragebogen: Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress*, 19(3), 192-207.

Skalendefinitionen:

- Persönlicher Burnout: $CBIPER = (CBIPER01 + CBIPER02 + CBIPER03 + CBIPER04 + CBIPER05 + CBIPER06) / 6$
- Arbeitsbezogener Burnout: $CBIWRK = (CBIWRK01 + CBIWRK02 + CBIWRK03 + CBIWRK04 + CBIWRK05 + CBIWRK06 + CBIWRK07) / 7$
- Klientenbezogener Burnout: $CBICLI = (CBICLI01 + CBICLI02 + CBICLI03 + CBICLI04 + CBICLI05 + CBICLI06) / 6$

Appendix H Skalen zur Erholungsqualität

1. Arbeitsbezogene Erholungsqualität				
<i>Instruktion</i> Hier beurteilen Sie Erholung während Ihrer Arbeitszeit. Bitte unterscheiden Sie dabei zwischen zwei Aspekten:				
A: <u>Erholungsmöglichkeiten</u> , Angebote, Freiräume Beispiele: Ihr Arbeitgeber ermöglicht Kurzpausen, stellt Ruheräume zur Verfügung, bietet die Möglichkeit, Sport zu treiben.				
B: <u>Persönliche Nutzung</u> Beispiele: Sie nutzen die Möglichkeiten für Ihre persönliche Erholung wie Kurzpausen einlegen, zum Sport gehen, Kurzschlaf machen.				
1. Wie gut sind die <u>vorhandenen Erholungsmöglichkeiten</u> in Ihrem Arbeitsumfeld? (RECWRKPSB)				
sehr gut	eher gut	teils-teils	eher schlecht	sehr schlecht
4	3	2	1	0
2. Wie gut sind die Erholungsmöglichkeiten in Ihrem Arbeitsumfeld für Sie <u>tatsächlich nutzbar</u> ? (RECWRKUTL)				
sehr gut	eher gut	teils-teils	eher schlecht	sehr schlecht
4	3	2	1	0
5. Wie intensiv <u>nutzen</u> Sie diese Erholungsmöglichkeiten für sich? (RECWRKUSE)				
sehr häufig	eher häufig	teils-teils	eher selten	sehr selten/nie
4	3	2	1	0
4. Wie gut können Sie sich <u>während eines typischen Arbeitstages</u> bei Bedarf erholen? (RECWRKDAY)				
sehr gut	eher gut	teils-teils	eher schlecht	sehr schlecht
4	3	2	1	0
<i>Instruktion</i> Im Folgenden geht es um die Erholung im Arbeitsumfeld insgesamt. Denken Sie nun bitte an das Verhältnis aus Belastungen und Erholung <u>während eines typischen Arbeitstages</u> .				
5. Wie gut ist das Verhältnis aus Belastung und Erholung hier? (RECWRKALL)				
sehr günstig	eher günstig	teils-teils	eher ungünstig	sehr ungünstig
4	3	2	1	0
2. Private Erholungsqualität				
<i>Instruktion</i> Hier beurteilen Sie Erholung während Ihrer Freizeit.				
1. Wie gut können Sie sich <u>nach einem typischen Arbeitstag</u> in Ihrer Freizeit erholen? (RECPRVAWD)				
sehr gut	eher gut	teils-teils	eher schlecht	sehr schlecht
4	3	2	1	0
2. Wie gut können Sie sich <u>an einem typischen Wochenende</u> in Ihrer Freizeit erholen? (RECPRVWEE)				
sehr gut	eher gut	teils-teils	eher schlecht	sehr schlecht
4	3	2	1	0
<i>Instruktion</i> Im Folgenden geht es um Belastungen in Ihrer <u>Freizeit</u> . Denken Sie bitte an alle Verpflichtungen, Anforderungen, Leistungserbringungen, Zwänge.				
3. Wie gut ist das Verhältnis aus Belastung und Erholung hier? (RECWRKALL)				
sehr günstig	eher günstig	teils-teils	eher ungünstig	sehr ungünstig
4	3	2	1	0

Hinweis. Instruktionen sind Bestandteil des Fragebogens; Unterstreichungen erleichtern den Teilnehmern das Erkennen des Teilaspektes.

Skalendefinitionen:

- Arbeitsbezogene Erholungsqualität: $RECWRK = (RECWRKPSB + RECWRKUTL + RECWRKUSE + RECWRKDAY + RECWRKALL) / 5$
- Private Erholungsqualität: $RECPRV = (RECPRVAWD + RECPRVWEE + RECPRVALL) / 3$

Appendix I Skalen zur sozialen Unterstützung

<i>Instruktion</i>				
Hier beurteilen Sie Ihre Zufriedenheit mit der sozialen Unterstützung, die Sie in den vergangenen 2-3 Monaten erhalten haben. Bitte unterscheiden Sie dabei zwischen zwei Arten sozialer Unterstützung:				
A: <u>Instrumentelle</u> soziale Unterstützung wie z. B. ...				
– Freunde, Ihr Vorgesetzter oder Kollegen helfen aus, wenn es „mal eng“ wird: Mit Arbeitsmitteln, Informationen, Tipps, zeitlicher Unterstützung ...				
– Ihr Arbeitgeber oder Ihr Vorgesetzter berücksichtigen Ihre privaten oder familiären Bedürfnisse durch Hilfestellungen wie z. B. bei der Arbeits- und Urlaubsplanung ...				
B: <u>Emotionale oder kognitive</u> soziale Unterstützung wie z. B. ...				
– Sie erhalten Zuspruch, Trost, Motivation ...				
– Man hört Ihnen zu und zeigt Verständnis, nimmt Ihre Sorgen ernst ...				
1. Wie zufrieden sind Sie mit der <u>instrumentellen</u> sozialen Unterstützung durch ...				
... Kollegen? (SSINSCOL)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... den/die Vorgesetzte(n)? (SSINSSUP)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... Familie/ Partner? (SSINSFAM)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... Freunde? (SSINSFRI)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
2. Wie zufrieden sind Sie mit der <u>emotionalen</u> sozialen Unterstützung durch ...				
... Kollegen? (SSEMOCOL)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... den/die Vorgesetzte(n)? (SSEMOSUP)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... Familie/ Partner? (SSEMOFAM)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... Freunde? (SSEMOFRI)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
3. Wie zufrieden sind Sie mit der <u>Erreichbarkeit und Verfügbarkeit</u> der sozialen Unterstützung durch ...				
... Kollegen? (SSACCCOL)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... den/die Vorgesetzte(n)? (SSACCSUP)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... Familie/ Partner? (SSACCFAM)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
... Freunde? (SSACCFRI)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4

Hinweis. Instruktionen sind Bestandteil des Fragebogens; Unterstreichungen erleichtern den Teilnehmern das Erkennen des Teilaspektes.

Skalendefinitionen:

- Soziale Unterstützung von Kollegen: SSCOL = (SSEMOCOL + SSINSCOL + SSACCCOL) / 3
- Soziale Unterstützung vom Vorgesetzten: SSSUP = (SSEMOSUP + SSINSSUP + SSACCSUP) / 3
- Soziale Unterstützung von Partner/Familie: SSFAM = (SSEMOFAM + SSINSFAM + SSACCFAM) / 3
- Soziale Unterstützung von Freunden: SSFRI = (SSEMOFRI + SSINSFRI + SSACCFRI) / 3

Appendix J Skalen zur Organisation

1. Person-Arbeit-Passung				
<i>Instruktion</i> Bitte beschreiben Sie, wie zufrieden Sie mit folgenden Aspekten Ihrer Arbeit sind.				
1. Wie interessant meine Arbeit ist (MATCH01)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
2. Wie gut meine Arbeit meinen Fähigkeiten entspricht (MATCH02)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
3. Die Qualifikationsanforderung meiner Arbeit (MATCH03)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
4. Die Abwechslung bei meiner Arbeit (MATCH04)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
2. Arbeitsbelastung				
1. Mein Arbeitspensum (STRAIN01)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
2. Meine Arbeitszeiten (STRAIN02)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
3. Das geforderte Arbeitstempo (STRAIN05)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4
3. Arbeitszufriedenheit				
Die Zufriedenheit mit meiner Arbeit insgesamt (SAT)				
sehr unzufrieden	eher unzufrieden	teils-teils	eher zufrieden	sehr zufrieden
0	1	2	3	4

Hinweis. Instruktionen sind Bestandteil des Fragebogens.

Skalendefinitionen:

- Person-Arbeit-Passung: $MATCH = (MATCH01 + MATCH02 + MATCH03 + MATCH04) / 4$
- Arbeitsbelastung: $STRAIN = (STRAIN01 + STRAIN02 + STRAIN05) / 3$
- Arbeitszufriedenheit: einzelne Frage

Appendix K Selbsteingeschätzte Gesundheit und gesundheitsbedingte Einschränkungen

1. Selbsteingeschätzte Gesundheit						
<i>Instruktion</i> Bitte beschreiben Sie Ihren Gesundheitszustand und gegebenenfalls daraus entstehende Beeinträchtigungen.						
1. Wie schätzen Sie Ihren <u>Gesundheitszustand allgemein</u> ein? (HLTHALL)						
sehr schlecht	schlecht	eher schlecht	weder gut noch schlecht	eher gut	gut	sehr gut
0	1	2	3	4	5	6
2. Wie schätzen Sie Ihre <u>psychische Gesundheit</u> allgemein ein? (HLTHMEN)						
sehr schlecht	schlecht	eher schlecht	weder gut noch schlecht	eher gut	gut	sehr gut
0	1	2	3	4	5	6
5. Wie schätzen Sie Ihre <u>körperliche Gesundheit</u> allgemein ein? (HLTHPHY)						
sehr schlecht	schlecht	eher schlecht	weder gut noch schlecht	eher gut	gut	sehr gut
0	1	2	3	4	5	6
2. Gesundheitsbedingte Einschränkungen						
<i>Instruktion</i> Bitte beschreiben Sie, wie sehr Sie durch Ihre Gesundheit beeinträchtigt werden.						
1. Wie sehr beeinträchtigt Sie Ihre <u>psychische Gesundheit</u> bei Ihrer Arbeitstätigkeit? (IMPENWRK)						
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß/gar nicht		
100	75	50	25	0		
2. Wie sehr beeinträchtigt Sie Ihre <u>körperliche Gesundheit</u> bei Ihrer <u>Arbeitstätigkeit</u> ? (IMPPHYWRK)						
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß/gar nicht		
100	75	50	25	0		
3. Wie sehr beeinträchtigt Sie Ihre <u>psychische Gesundheit</u> bei Ihren regelmäßigen Aktivitäten <u>außerhalb der Arbeitstätigkeit</u> (z. B. Einkaufen, soziale Aktivitäten, Haushalt ...)? (IMPENPRV)						
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß/gar nicht		
100	75	50	25	0		
4. Wie sehr beeinträchtigt Sie Ihre <u>körperliche Gesundheit</u> bei Ihren regelmäßigen Aktivitäten <u>außerhalb der Arbeitstätigkeit</u> (z. B. Einkaufen, soziale Aktivitäten, Haushalt ...)? (IMPPHYPRV)						
in sehr hohem Maß	in hohem Maß	etwas	in geringem Maß	in sehr geringem Maß/gar nicht		
100	75	50	25	0		

Hinweis. Instruktionen sind Bestandteil des Fragebogens; Unterstreichungen erleichtern den Teilnehmern das Erkennen des Teilaspektes.

Skalendefinitionen:

- Subjektive Gesundheit: HLTH = (HLTHALL + HLTHMEN + HLTHPHY) / 3; 7-stufige Skala wurde in Pretests als angemessener beurteilt als eine 5-stufige Skala
- Gesundheitsbezogene Einschränkungen: IMP = (IMPENWRK + IMPPHYWRK + IMPENPRV + IMPPHYPRV) / 4; numerische Abstufung entspricht Abstufung des Copenhagen Burnout Inventory

Appendix L Bewegung und Sport

Instruktion

1. Wenn Sie Sport treiben, wie viel Sport mit hoher Anstrengung treiben Sie in einer durchschnittlichen Woche?
Beispiel: Unter der Woche insgesamt 2 Stunden netto im Fitnesscenter, am Wochenende 1 Stunde Joggen. Das macht 3 Stunden insgesamt.

In diesem Fall müssten Sie die Zahl 3 für 3 Stunden Sport pro Woche angeben.

1. Hohe Anstrengung:

[] Stunden (SPODURH) und

[] Minuten (SPODURM)

2. Wie häufig treiben Sie normalerweise Sport pro Woche?

[] mal (SPOCNT)

Instruktion

3. Wie viel moderate körperliche Anstrengung haben Sie pro Woche?

Beispiel: Fahrradfahren, entspanntes Schwimmen, intensive Gartenarbeit, Nordic Walking.

Moderate Anstrengung:

[] Stunden (MODDURH) und

[] Minuten (MODDURM)

4. Wie häufig haben Sie normalerweise eine moderate körperliche Anstrengung pro Woche?

[] mal (MODCNT)

Hinweis. Instruktionen sind Bestandteil des Fragebogens; Unterstreichungen erleichtern den Teilnehmern das Erkennen des Teilaspektes.

Skalendefinitionen:

- Bewegungshäufigkeit: $PAFRQ = (SPOCNT + MODCNT)$
- Bewegungsdauer: $PADUR = [1.5 \times (SPODURH + SPODURM) + (MODDURH + MODDURM)]$; Stunden müssen in Minuten umgerechnet werden