From stress to engagement
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Chapter 9
Summary

The main aims of this thesis were to evaluate the assessment of stress complaints in an occupational health surveillance program; to evaluate the extent to which two stress-reducing interventions might reduce psychological complaints and sickness absence; to study the role of coping in the sickness absence process; and to identify predictors of burnout and work engagement. As is clear from these objectives, stress and the management of stress are the central themes of the thesis. There are good arguments for this choice. In the Netherlands in 2006 about 29% of employees reported working under stress. Aside from its impact on employees' health and well being in terms of distress, depression, anxiety, hypertension, and cardiovascular disease, job stress also has a significant economic impact on organizations. It is estimated that 45% of the total costs of absenteeism and disability in the Netherlands (12 billion Euros) is due to job stress-related sick leave and disability. Therefore the management of job stress, including the resulting strain, health problems, and in particular the mental workload, has become increasingly important. Stress management programs, focused on the organization or on the individual, can help to prevent or reduce work-related stress. The current thesis mainly focuses on the effects of programs for individual workers. However, prevention is not enough. There is also a plea for health promotion in the sense that employees need to be engaged in their work in order to excel.

This thesis is rooted empirically in occupational health surveillance and intervention programs that have been conducted by KPN Telecom, the largest Dutch telecom company. Several questions have been addressed in the studies presented in this thesis. First, we wanted to know how reliable a particular screening instrument for psychological problems is in the general working population and which cut-off point can be used to determine potential future cases from healthy employees. Second, the effectiveness of two different, brief stress management programs
was examined. Finally, the role played by coping in the sickness absence process was evaluated as well as the role played by work characteristics and personality in the development of burnout and engagement.

In chapter 2 the Four-Dimensional Symptom Questionnaire (4DSQ) was psychometrically evaluated in a working population. Terluin developed the 4DSQ in 1994 to measure four symptom dimensions in primary care patients that proved to be necessary and were sufficient to describe the whole range of common psychological complaints: Distress, Depression, Anxiety and Somatization. A total of 7,522 employees of KPN Telecom were invited to participate in an occupational health surveillance program with a special focus on job stress. Altogether, 3,852 employees (response rate of 51%) completed and returned the baseline questionnaire. Reliability, correlations between the 4DSQ scales, the factorial structure, intercorrelations between the four scales, and correlations of these scales with job stress, strain, and coping behavior were calculated. The internal consistency of the 4DSQ scales was found to be good, since all values of $\alpha$ met the criterion of .70. Furthermore, to find out whether each of the 4DSQ scales covered a unique part of the spectrum of common psychological symptoms, Cronbach’s $\alpha$ values of the residuals of the items of each scale were calculated. These values were all above .60 and therefore cover a unique domain of psychopathology. The four-factor structure of the 4DSQ was largely confirmed, indicating that the four scales measure different dimensions of common psychological symptoms. However, Distress and Depression showed some overlap. Six items on the Distress scale were found to load on the Depression factor as well. Nevertheless, a three-factor model, in which the Depression and Distress factors were combined into one factor, proved to be inferior to the original four-factor model.

Furthermore, it was demonstrated that Distress is associated with job stressors and other indicators of strain, suggesting that the 4DSQ is a reliable and valid instrument with which to measure Distress and other common psychological problems in the working population. When screening for mental health problems takes place in an unselected population, a two-stage approach is recommended. At first, it will suffice to administer only the Distress and Somatization scales to identify “stressed” employees. To those with elevated Distress scores the Depression and Anxiety scales can be added to further refine the assessment.
In chapter 3, a cutoff point for the Distress scale of the 4DSQ was established. Remarkably, the use of a cutoff point for inclusion in preventive stress management programs or other interventions to prevent sickness absence due to psychological complaints in occupational health practice has not been reported until now. Besides being used to select participants for a preventive stress management program, a cutoff point can be used to estimate the prevalence of Distress across demographic and occupational subgroups. Furthermore, a well-founded cutoff point can be used as a criterion to classify cases for research purposes. The criterion used to establish the cutoff point was the prediction of sickness absence.

Two samples of employees who differed in levels of Distress were used; one sample representing healthy, working employees (N = 3,852) and one sample consisting of employees who, over a period of 14 months, had been on sick leave for more than two weeks because of a stress-related disorder due to a recent identifiable psychosocial stressor at work (N = 280). 4DSQ Distress scores were calculated for both samples. To identify employees in a working environment at risk for sickness absence due to psychological complaints we first explored the test threshold which discriminates between distressed employees with and without, respectively, sickness absence due to stress at work or due to a stress-related disorder related to a recent identifiable psychosocial stressor at work (adjustment disorder). A Receiver Operating Characteristic (ROC) analysis was used to define the cutoff point. To establish a cutoff point that discriminates best between both groups, we first created a study population with equal proportions of both samples, consisting of 280 employees per group. Secondly, we formed a study population similar to a working population with a normal prevalence of sickness absence due to psychological complaints (N = 3677). The establishment of an optimal cutoff point, using ROC analysis, was based on an optimal trade-off between sensitivity and specificity. However, due to the low prevalence of sickness absence as a result of distress, the specificity was considered to be more crucial than the sensitivity.

A cutoff point of ≥ 11 was established as a credible (first phase) selection criterion for interventions such as stress management programs, as well as for future studies on occupational health interventions to reduce distress and mental health disorders. The cutoff point of 11 corresponds with a sensitivity of 95%, a specificity of 90%, a positive predictive value
of 17% and a negative predictive value of 99.8%. This means that there 
is a one-in-six chance that an employee in the working population who 
scores at or above the cutoff score of 11 may actually go on sick leave for 
psychological reasons in the next year. Therefore, a second test (as part of 
serial multi-testing), for example an individual interview, may distinguish 
more accurately whether or not an employee should be included in an 
intervention.

Chapter 4 describes an a priori randomized trial that sought to evaluate 
the short-term and long-term effectiveness of two brief preventive 
stress reduction programs—a combined intervention including physical 
exercise and relaxation, and a cognitive focused program—in reducing 
psychological problems in stressed employees. Both interventions 
consisted of four training sessions, each lasting for one hour, which were 
given over a period of eight weeks. The intervals between the sessions 
were two weeks, two weeks and four weeks. The last session concluded 
with advice on the prevention of relapse. The study was designed as a 
randomized clinical trial with pre-trial, post-trial and six-month follow-up 
measures.

The aim of the physical intervention was to increase awareness and to 
introduce physical and relaxation exercises in daily work activities. Every 
session consisted of four parts: (1) an introduction explaining the notion 
of stress and its physical, psychological and behavioral effects, discussing 
ways of coping through physical activities and assessments of the previous 
weeks; (2) warm-ups and other physical exercise (keep fit exercises, 
fitness exercises that focus on the relationship between heart rate and 
strain); (3) relaxation exercise (progressive muscle relaxation, breathing 
exercises, muscle stretching, autogenous training, meditation); and (4) an 
assignment to be completed at home.

The aim of the cognitive intervention was to restructure irrational beliefs. 
The theme of the first session was education (didactical stress management) 
and employees were asked to make a list of stressors, both job-related 
and non-job-related. In the second session this list was discussed with the 
Counsellor. The theme of the third session was Rational Emotive Therapy 
(RET) and employees were given training to familiarize themselves with 
this skill. The final session was a review of the specific skills for which 
employees had received training in the previous sessions.
A working population of 7,522 employees from KPN was invited to participate in a periodic health check-up. About 51% (N=3,852) agreed to participate and filled out the questionnaire. The most distressed employees, about 10% of the study population (N = 396), corresponding with a cutoff point of 11, were randomly assigned to one of two conditions, as portrayed above. Psychological complaints were measured with the 4DSQ, the Utrecht Burnout Score (UBOS) for burnout and the Checklist Individual Strength (CIS) for fatigue.

The effectiveness of the interventions was tested on pre-test, post-test and follow-up scores. To compare these results with those described in the literature, the effect sizes (Cohen’s d) as a standardized measure of change were calculated. Finally, the clinically significant change was calculated, according Jacobsen’s method.

No differential effect between the two interventions could be demonstrated. It was found that both conditions revealed a positive impact on psychological complaints, burnout, and fatigue, both at the short term (post-test) as well as at the 6-months’ follow-up.

More specifically, the short-term effects we found were that (1) there was a significant decline after both interventions, for psychological complaints (4DSQ), for exhaustion and professional efficacy (UBOS), and for subjective fatigue and reduced activity (CIS). (2) A large effect-size was found for Distress in the cognitive intervention group. Medium effect-sizes were found for Depression, Somatization and fatigue in the cognitive intervention group, and for Distress, Depression and Anxiety in the physical intervention group. (3) The short-term return to normal functioning ranged from 31-61% in the cognitive intervention group and from 37-54% in the physical intervention group, depending on the outcome data.

The follow-up effects at six months showed a similar pattern. (1) The positive reduction in psychological complaints remained stable six months after the last session for both groups. For burnout the physical intervention group still demonstrated substantially lower levels of exhaustion, cynicism and reduced professional efficacy, whereas the cognitive intervention group demonstrated the opposite, an increase in exhaustion and cynicism. For fatigue, the significant reduction for subjective
fatigue and reduced activity was still there in both groups, and might be attributed to short-term effects. (2) A large effect size was demonstrated for Distress in both intervention groups. Medium effect sizes were apparent for Depression, Anxiety and Somatization in both intervention groups and for subjective fatigue, reduced activity and reduced concentration in the physical intervention group. (3) Approximately 50 – 60 % of the employees with psychological complaints who participated in one of the intervention groups improved and returned within six months to functioning within normal range. As far as burnout and fatigue were concerned the improvement was less substantial. For exhaustion 31 – 39 % of the employees in both groups returned to normal functioning; the percentages for subjective fatigue were somewhat higher.

These results justify the conclusion that both a brief physical and a brief cognitive intervention are successful in reducing psychological complaints, burnout and fatigue, and in stimulating a return to normal functioning at work.

Chapter 5 describes the evaluation of the same two preventive stress management programs using a similar randomized study design but now on prospective sickness absence across the next year, in stressed and non-stressed employees. A comparison could be made with sickness absence figures in the year before the intervention. However, in the study described in this chapter results from non-stressed employees randomized over the two intervention programs could be incorporated as well. Furthermore, sickness absence was reported in terms of spells and days and was classified according to the system developed in 1998 by Hensing et al. Spells were distinguished in frequency (total number of absence spells) and incidence rate (new number of spells). For sickness absence days the following definitions were applied: length (total days) and duration (mean days per spell). Furthermore, the period between the intervention and the beginning of a new period of absenteeism (time to return to work) was evaluated.

Due to skewed sickness absence data non-parametrical statistical analyses were performed to evaluate differences in frequency, absence incidence rate, absence duration and length of absenteeism and the time period before the beginning of a new period of absenteeism after the intervention. In comparison with the year before the intervention no significant effects
were demonstrated for treated, non-stressed employees. For stressed employees however, the physical intervention significantly decreased the frequency and incidence rate of sickness absence. No significant effects were found on duration, length, or time to the onset of a new period of sickness absence. The cognitive intervention showed an unexpected, significant shortening of the time to the onset of a new period of sickness absence when employees are stressed. No effect on the other sickness absence measures was demonstrated.

For stressed employees, in comparison with the physical intervention the cognitive intervention decreased the time period between the intervention and the onset of a new period of sickness absence by 144 days. Since the other sickness absence measures are not affected, the shortening of the sick-leave-free period may be a result of an increased awareness of stress and the decision to stop for a while in order to recuperate early.

Because we found no other substantial differences in effectiveness between both interventions, it was concluded that in general the differences between both types of interventions are marginal and that the illness burden represented by absenteeism is equally affected by both of them. However, some caution must be applied when interpreting these results, because of the relatively small groups and the skewing of sickness absence data.

In chapter 6, the role of coping styles in sickness absence is evaluated, using a prospective design spanning one year. The same study population described before was used. The coping strategy of the participants was assessed by using the shortened 19-item version of the Utrecht Coping List (UCL). This questionnaire is designed to measure ways of coping people use in stressful situations, either major life events or daily hassles. Measures used for sickness absence were frequency (total number of absence spells), length (total days) and duration (mean days per spell), and the time before the onset of a new episode of absenteeism. The duration of sickness absence was classified into more than or less than 7 days.

Confirmatory factor analysis was used to test the fit of the model that assumes a five-factor structure of the short form of the UCL. Five ways of coping are distinguished: “active problem-solving coping,” “seeking social support,” “palliative reaction,” “avoidance behavior,” and “expression
of emotions." "Active problem solving" and "avoidance behavior" show the most consistent pattern of associations across all sickness absence measures. More active coping is associated with less sickness absence and more avoidance coping with more sickness absence (e.g. there are 1.35 fold greater odds of length of sickness absence for high avoidance coping than for low avoidance coping). Adjusted for several confounding factors, the future length of sickness absence is predicted by "active problem-solving coping" and "palliative reaction," e.g. looking for distraction. The future duration of sickness absence is predicted by "active problem-solving coping," "avoidance behavior" and "seeking social support." Next year's frequency of sickness absence is predicted by "active problem-solving coping," "avoidance behavior" and "expression of emotions." The median time before the onset of a new sickness absence episode is significantly extended for those who use active problem-solving (24 days later for high active compared with low active employees) and is reduced for those who use avoidance coping (38 days earlier for high avoidant compared with low avoidant employees) as well as for those with a palliative response (36 days earlier for high palliative compared with low palliative employees).

In chapter 7, attention shifted towards positive health by including the examination of work engagement, the assumed opposite of burnout. The main purpose of the study in this chapter was to demonstrate that, as hypothesized by the Job Demands-Resources (JD-R) model, job demands and lack of job resources predict future burnout, whereas job resources predict future work engagement. Secondly, we investigated to what extent personality contributes to these predictions. Finally, we evaluated the short-term (one year) and longer term (two years) effects of job characteristics and personality traits, in different combinations, on future levels of work engagement and burnout.

Longitudinal data were gathered from two independent groups (sample 1 = one year; N = 201 and sample 2 = two years; N = 151) of middle managers and executives at KPN, who participated in an extensive survey on employee health and well-being. All participants received a questionnaire that included questions about job resources, job demands, burnout, work engagement, and personality. Four job resources were assessed: social support from colleagues, job control, opportunities to learn and develop, and performance feedback. Four job demands were assessed:
work overload, emotional demands, cognitive demands, and work-home interference. Work engagement was assessed with two scales (vigor and dedication) of the Utrecht Work Engagement Scale (UWES) and burnout was assessed with two scales (exhaustion and cynicism) of the Dutch version of the Maslach Burnout Inventory-General Survey. Personality was assessed with the dimensions extraversion and neuroticism from the Dutch version of the Neo-Five Factor Inventory.

As expected, burnout was predicted by high job demands and insufficient job resources. Work-home interference (Samples 1 and 2) and high emotional demands (Sample 2) predicted exhaustion and cynicism, albeit that the effect of work-home interference on exhaustion in Sample 1 disappeared after controlling for exhaustion at baseline. In a similar vein, lack of opportunities to learn (Samples 1 and 2) and lack of autonomy (Sample 2) predicted exhaustion and cynicism, but this effect disappears after controlling for baseline burnout levels.

That engagement is predicted by job resources is partly confirmed. Before introducing baseline vigor and dedication, it was observed that high social support (Sample 1), opportunities to learn (Samples 1 and 2) and high levels of autonomy (Sample 2) predicted T2 vigor and dedication. However, after controlling for baseline engagement levels, the effect of learning opportunities disappeared. Unexpectedly, high work-home interference predicted low T2 dedication (Sample 1). Furthermore, high neuroticism predicted burnout as far as exhaustion (Sample 2) and cynicism (Sample 1) are concerned, but only when not controlled for baseline levels. Unexpectedly, extraversion negatively predicts future exhaustion (Sample 1), but again, this is only the case when not controlled for baseline levels. As hypothesized, engagement was predicted by high extraversion and low neuroticism. Neuroticism had a negative impact on vigor and dedication (Samples 1 and 2), but only when not controlled for baseline levels. Extraversion predicted vigor in both samples, but only in Sample 2 does the effect remain significant after controlling for baseline levels. Thus, our findings support the JD-R model, but suggest that the model should be supplemented with personality traits in order to increase its predictive power.

The above-mentioned effects are stronger for Sample 1 than for Sample 2, both in terms of the number of significant effects as well as in terms of
percentages of explained variance. Thus, as expected, predictions across a one-year period were more numerous and stronger than those across a two-year period.

Finally, in *chapter 8*, the results of the studies were reviewed in a general discussion. Principal findings, weaknesses and strengths, practical relevance, some applications, and implications for occupational health care and for organizations are discussed.

It was concluded that, in line with other results in the scientific literature, this dissertation revealed that secondary prevention of the consequences of work stress is successful for employees. Based on the results, four implications for occupational health care and for organizations were stipulated. The first implication for occupational health care is the recommendation to use regular occupational health surveillance based on the 4DSQ. The Distress scale particularly demonstrated strong correlations with job stress and indicators of strain. We defined a cut-off point which can be used as a valid selection tool for stress management programs. Because we realize that with this cut-off point most employees are not identified as belonging to the population that will be on sick leave due to stress within a one-year period, we have proposed an additional second test.

Secondly, we demonstrated that the stress management interventions had a positive impact on complaints but not on absenteeism. The type of intervention seems not to be significant since both physical and cognitive interventions were about equally effective.

A third finding of this thesis is that the addition of personality traits to the job demands-resources (JD-R) model would increase its predictive power. The JD-R model has proven to be an adequate theoretical framework for explaining the motivating potential of job resources, but also for explaining a health impairment process induced by job demands. In addition, low scores on neuroticism and high levels on extraversion predict future engagement, whereas high scores on neuroticism and low levels on extraversion predict future burnout.

A final important finding of this thesis is the use of coping strategies in interventions. Employees with an active problem-solving coping strategy are less likely to drop out because of sickness. Influencing the means of
coping during an intervention, therefore, is important for the final result as far as sickness absence is concerned.

In summary, to prevent complaints or sickness absence due to job stress, we first recommend regular health surveillance based on the extended JD-R model with use of the 4DSQ and the UCL, as well as a questionnaire on risk factors at the workplace, to detect high-risk employees. Second, we recommend a stress intervention program for high-risk employees, cognitively or physically oriented, and lasting at least four sessions. Third, active coping strategies are indispensable for successful interventions as far as sickness absence is concerned. Finally, the emerging psychological concept of work engagement, a challenging new focus for occupational health care and organizations, is positively associated with job resources and high scores on extraversion. In our view, this knowledge and the recommendations we have made are important ingredients for a healthy and engaged organization.