BURNOUT AND JOB ENGAGEMENT IN DENTISTRY

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BURNOUT AND JOB ENGAGEMENT IN DENTISTRY

ACADEMISCH PROEFSCHRIFT

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door
Johannes Henricus Maria te Brake
geboren op 2 september 1971
te Voorhout

Emotional exhaustion (EE) refers to feelings of being overextended, both emotionally and physically. Depersonalisation (D) is characterized by negative, cynical attitudes and feelings about one's recipients. A reduced sense of personal accomplishment (PA) refers to the negative evaluation of oneself, particularly in relation to job performance.

Although the application of the MBI has been extended to a wide variety of settings (e.g., Schutte *et al.*, 2000), originally it was intended to be used within the 'human services'. It has been established that differences in response pattern were present between human services samples and non-human services samples (Evans & Fischer, 1993). However, even within the context of human services, systematic variances in response style among different occupations or research groups can necessitate a more careful interpretation of results. Therefore, despite its almost universal acceptance, continued psychometric evaluation of the MBI is warranted.

Entrepreneurs within the health care system, like dentists, general practitioners and physiotherapists, can be considered of special interest among the human services. In being a free entrepreneur, personal financial risk and high levels of autonomy characterize the working environment, but at the same time freedom is confined by strong restrictions imposed by government and insurance companies. In addition, the dental work is characterized by isolated conditions and a strong reliance on technical skills, whereas in other human services professions colleagues or superiors are present, and counselling is more relevant than technical ability (Gorter *et al.*, 1999a; Gryskiewicz & Buttner, 1992).

Earlier, the applicability of the Dutch version of the Maslach burnout inventory (MBI-NL) was assessed among dentists (Gorter *et al.*, 1999a). It was concluded that the MBI-NL in its original form could be considered a suitable instrument for administration among Dutch dentists. Nevertheless, to consolidate the conclusions on the applicability of the MBI among dentists and to examine possible deviations that are specific within the field of dentistry, additional research on the factorial structure is necessary. Additionally, at present no data are available on the way in which burnout develops among dentists. Notwithstanding the apparent consensus on the three-factor structure of the MBI, it is by no means clear how to differentiate between the three subscales in terms of their chronological order.

Regarding the sequence of the MBI-NL subscales, several models can be considered. According to the original definition (Maslach *et al.*, 1996), burnout develops from an increased EE to a heightened D, after which feelings of PA are reduced. The progressive phase model (Golembiewski & Munzenrider, 1988) proposes an alternative sequence of D-PA-EE. Although some studies found support for the latter model (e.g., Gryskiewicz & Buttner, 1992), these studies were severely criticized on methodological and theoretical grounds (Brouwers, 2000; Leiter, 1989). Finally, a sequence of PA-EE-D was proposed in a study among physiotherapists (De Vries, 2001).

This study intends to strengthen the knowledge on the applicability of the MBI among health care entrepreneurs. To this end, two independent samples of dentists will be used to investigate the structure of the MBI-NL. In line with earlier findings by Gorter *et al.*(1999a), a three-factor structure is hypothesized to fit the data best. Additionally, unique within the field of dentistry, several proposed sequences of the burnout dimensions are compared. Finally, and most interestingly, results are compared to findings among other occupations within health care.

Material and methods

PARTICIPANTS AND PROCEDURE

Two large-scale surveys were performed among representative groups of dentists in the Netherlands. In the first study in 2000 a questionnaire was sent to a total of 885 dentists-general practitioner, all of which were approached previously in a related study conducted in 1997 (Gorter, 2000). In 2001, a new group of 848 dentists was approached, making sure there was no overlap with respondents in the 2000-study. Care was given to the comparability with the general population of dentists in The Netherlands concerning the distribution of gender, age and region. Comparison material among other entrepreneurs within health care was obtained from Bakker, Schaufeli, Sixma and Bosveld (2001) and De Vries (2001). Where possible, findings among non-entrepreneurs were also used (based on research in physical and mental

health care, geriatric care, disabled care, public welfare, and police / justice) (Schaufeli & Van Dierendonck, 2000).

MATERIAL

In both studies, a Dutch translation of the Maslach Burnout Inventory (MBI) was used to measure burnout (Maslach et al., 1996; Schaufeli & Van Dierendonck, 1995, 2000). With the publication of a new manual (Schaufeli & Van Dierendonck, 2000) the Dutch version of the MBI was renamed Utrechtse Burnout Schaal (UBOS)[3]. Analogous to the original MBI, three versions of the UBOS were developed, distinguishing between contactual occupations (UBOS-C), teaching occupations (UBOS-L) and other, more general occupational groups (UBOS-A). In this study the UBOS-C was used, which is comparable with the MBI-human services survey (MBI-HSS (Maslach et al., 1996)). The UBOS-C (Schaufeli & Van Dierendonck, 2000) differs from the original MBI-HSS in that two items were deleted because it was found these did not fit well in the proposed factor-structure (Schaufeli & Van Dierendonck, 1993, 1995). The remaining 20 items can be answered on a 7-point Likert-scale, ranging from 0 ('never) to 6 ('every day'). Three subscale scores can be acquired; EE (8 items), D (5 items) and PA (7 items). Examples of items from each subscale are: "I feel emotionally drained from my work" (EE); "I don't really care what happens to some patients" (D); and "I deal very effectively with the problems of my patients" (PA).

STATISTICAL ANALYSIS

Internal consistency of the three subscales was assessed using Cronbach's alpha and interscale correlations were assessed by Pearson's correlations. To determine the dimensionality of burnout, six confirmatory factor analytic models (M_0 – M_5) were analyzed using the LISREL 8.50 program. A null model (M_0), in which all item scores are uncorrelated, is necessary to create a base-line with which all other models can be compared. The second model (M_1) was a one-factor model in which all items load on

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[3] MBI-NL, UBOS, and UBOS-C are three labels used for the Dutch burnout questionnaire in chapters throughout this thesis. In each instance, an identical 20-item questionnaire is used.

one common 'burnout' factor. Because it was found that the EE and D scale show a high correlation and a two-factor model, in which EE and D are combined, showed a reasonable fit (Gorter et al., 1999a), such a model was also included added (M_2). The fourth model (M_3) was an orthogonal three-factor model in which the three factors are not correlated with each other – this is the original model (Maslach et al., 1996). The fifth model (M_4) was an oblique three-factor model in which the three factors are allowed to correlate. Finally, a second order-factor model (M_5) in which the three factors load on one common fourth factor was included. In doing so, standardized factor-loadings were obtained which give additional insight in the coherence between the three first order-factors (e.g., EE, D and PA) and the second order-factor (e.g., 'burnout').

The goodness-of-fit of the models was determined using absolute and relative fit indices. The widely used absolute indices are supplemented with relative fit indices to be able to draw better conclusions about the differences in goodness-of-fit between the different models. Absolute fit indices were the chi-square goodness-of-fit index (χ^2) with the accompanying degrees of freedom and the Root Mean Square Error of Approximation (RMSEA). Relative fit indices are the Non-Normed Fit Index (NNFI), also called the Tucker Lewis Index (TLI), and the Comparative Fit Index (CFI). In contrast to the absolute indices, relative indices are independent of sample size and are therefore to be preferred (Bentler, 1990). Furthermore, the NNFI is comparably more robust for sample size than both the RMSEA and the CFI (Marsh, Balla & McDonald, 1988). The fit of a model is good when the values of the NNFI and the CFI approach 1; a higher value represents a better fit. For these indices most studies consider a value of 0.90 or higher as indicative of a good fit (De Vries, 2001; Schaufeli, Salanova, González-Romá & Bakker, 2002b). For the RMSEA, values smaller than 0.08 imply a good fit. Further possible improvements to the three-factor structure were investigated using explorative factor analysis (PCA, employing Varimax rotation) on both sets of data.

To determine the sequence of the three burnout components, three structural confirmatory analytic models were tested (SM_1 – SM_3): the original model proposed (Maslach *et al.*, 1996) (SM_1), containing the sequence EE-D-PA; a model proposing

the D-PA-EE sequence (Golembiewski & Munzenrider, 1988) (SM_2); and, in replication of De Vries (2001), an alternative model proposing the sequence PA-EE-D (SM_3).

Results

RESPONSE

Of the 885 questionnaires that were sent in 2000, 22 proved undeliverable; 493 usable questionnaires were returned (response rate 57.1%). A number of these dentists had participated in an intervention study, which had included 2 additional measurements (Gorter, 2000; Te Brake, Gorter, Hoogstraten & Eijkman, 2001). Because their participation was likely to have an effect on their burnout scores, this group was excluded from further analysis, resulting in a total research group of 433 dentists. In 2001, 497 (58.6%) of the 848 newly approached dentists returned a usable questionnaire. Further descriptive characteristics are presented in table 1; characteristics in 2000 did not significantly differ from the 2001 data.

TABLE 1. DESCRIPTIVE CHARACTERISTICS OF THE 2000 AND 2001 SAMPLES

	2000 N=433	2001 N=497
Gender (%)		
Men	83.1	75.5
Women	16.9	24.5
Civil status (%)		
Single	4.3	4.3
Divorced	1.4	3.7
Married/Cohabitation	94.1	91.6
Widow/Widower	0.2	0.4
Mean age (SD)	45.8 (7.7)	44.6 (9.0)
Mean working hours (SD)	31.7 (7.6)	31.0 (8.8)
Mean administration hours (SD)	6.6 (5.6)	5.1 (4.6)
Number of patients per week (%)		
<20	2.4	1.0
20-50	8.9	12.6
50-75	17.7	21.0
75-100	23.9	17.9
100-125	21.0	23.2
>125	26.1	24.3

PSYCHOMETRIC RESULTS

Table 2a shows the internal consistencies and interscale correlations of the 2000 and 2001 studies as compared with (in table 2b) the norm scores (Schaufeli & Van Dierendonck, 2000), physiotherapists (De Vries, 2001) and general practitioners (Bakker et al., 2001). Results for the internal consistency indicate a high comparability between samples. The EE-D correlations in both studies were higher than those reported in the UBOS-C manual. However, they did correspond with the correlations found among physiotherapists and general practitioners. Both the EE-PA and the D-PA correlations among dentists showed some variations across studies; especially the higher correlation in 2001 was noteworthy. These higher correlations in 2001 do correspond with the data found among general practitioners. Both in the study among physiotherapists and in the UBOS-C manual lower values are reported, consistent with the results from the 2000-study.

TABLE 2A. INTERNAL CONSISTENCY (DIAGONAL) AND INTERSCALE CORRELATIONS OF THE UBOS-C SUBSCALES FOR THE 2000 AND THE 2001 STUDIES

	Study 2000			Study 2001		
	EE	D	PA	EE	D	PA
EE	0.89			0.90		
D	0.59	0.73		0.59	0.70	
PA	-0.29	-0.28	0.79	-0.36	-0.44	0.83

TABLE 2B. INTERNAL CONSISTENCY (DIAGONAL) AND INTERSCALE CORRELATIONS OF THE UBOS-C SUBSCALES FOR THE MANUAL (SCHAUFELI & VAN DIERENDONCK, 2000), DUTCH PHYSIOTHERAPISTS (DE VRIES, 2001) AND DUTCH GENERAL PRACTITIONERS (BAKKER *ET AL.*, 2001)

	UBOS-C manual			Physiotherapists			General practitioners		
	EE	D	PA	EE	D	PA	EE	D	PA
EE	0.87			0.91			0.90		
D	0.49	0.66		0.59	0.71		0.58	0.71	
PA	-0.20	-0.30	0.79	-0.23	-0.28	0.80	-0.44	-0.41	0.71

Note: EE: emotional exhaustion, D: depersonalisation, PA: personal accomplishment.

MBI STRUCTURE

The goodness-of-fit indices are presented in table 3. For each of the six factor analytic models similar values were found in 2000 and in 2001. Compared to the other models, the oblique three-factor model (M_4) showed the best fit; values of NNFI and CFI were closest to 1 and RMSEA was closest to 0. These results correspond with results found among physiotherapists. It should be noted, however, that in both studies the NNFI did not meet the criteria for a 'good fit', nor did the CFI in the 2000 study.

TABLE 3. FACTOR ANALYTIC MODELS OF THE UBOS-C FOR THE STUDIES IN 2000, 2001 AS COMPARED WITH THE UBOS-C MANUAL (SCHAUFELI & VAN DIERENDONCK, 2000) AND DUTCH PHYSIOTHERAPISTS (DE VRIES, 2001)

Model	χ^2	df	RMSEA	NNFI	CFI
Study 2000					
M_0	3619.94	190	0.310	0.00	0.00
M_1	1222.81	170	0.140	0.66	0.69
M_2	717.50	170	0.094	0.82	0.84
M_3	797.08	170	0.090	0.80	0.82
M_4	540.37	167	0.075	0.88	0.89
M_5	540.37	167	0.075	0.88	0.89
M_6	540.88	149	0.082	0.86	0.88
M_7	581.89	167	0.080	0.86	0.88
Study 2001					
M_0	4663.65	190	0.340	0.00	0.00
M_1	1529.20	170	0.160	0.66	0.70
M_2	890.83	170	0.100	0.82	0.84
M_3	991.33	170	0.096	0.79	0.82
M_4	609.17	167	0.075	0.89	0.90
M_5	609.17	167	0.075	0.89	0.90
M_6	656.16	149	0.087	0.87	0.88
M_7	705.71	167	0.086	0.86	0.88
Manual: Total group					
M_0	86010.66	190	[a]	0.00	0.00
M_2	37619.23	170	[a]	0.51	0.56
M_4	7955.35	167	[a]	0.90	0.91
Physiotherapists					
M_0	10039.15	190	[a]	0.00	[a]
M_1	2998.42	170	[a]	0.68	[a]
M_2	1522.89	170	[a]	0.85	[a]
M_3	1699.36	170	[a]	0.83	[a]
M_4	1061.92	167	[a]	0.90	[a]

Note: χ^2: Chi-square goodness-of-fit index, df: degrees of freedom, RMSEA: Root Mean Square Error of Approximation, NNFI: Non-Normed Fit Index, CFI: Comparative Fit Index. M_0: Null model, M_1: One-factor model, M_2: Two-factor model (EE and D combined in one factor and PA as a second factor), M_3: Orthogonal three-factor model in which the three factors are not correlated with each other, M_4: Oblique three-factor model in which the three factors are correlated with each other, M_5: Second order-factor model. M_6: An alternative for M_4, with item 11 loading on EE and excluding item 20, M_7: An alternative for M_4, with both item 11 and item 20 loading on EE. [a]Values not reported in original studies.

The goodness-of-fit indices for the M_5 were identical to those of M_4 because their mathematical structures were the same. However, the fitting of M_5 did produce the standardized factor-loadings of EE, D and PA on a common second order-factor ('burnout'). These factor loadings had corresponding patterns for both studies (2000 and 2001). The respective values of the factor-loadings were 0.85, 0.88 and –0.43 in 2000 and 0.77, 0.98 and –0.57 in 2001, for EE, D and PA respectively. These values are very similar to the factor-loadings found among physiotherapists (EE: 0.77, D: 0.95 and PA: –0.37). Moreover, a corresponding pattern (e.g., high factor loadings for EE and D and lower loadings for PA) was found elsewhere (Cordes, Dougherty & Blum, 1997), although it should be noted that in that study a slightly different version of the MBI was used.

EXPLORATIVE ANALYSES

An explorative factor analysis on the 2000-data, using Varimax rotation, revealed a four-factor structure in which two PA-items (item 4: 'I can easily understand how my recipients feel about things' and item 7: 'I deal very effectively with the problems of my recipient') loaded on a separate fourth factor. The same analysis performed on the 2001-data did reveal the three-factor structure, although items 11 and 20 loaded on EE instead of D (as was theoretically proposed). Furthermore, item 20 had overall low loadings (EE: 0.37, D: 0.30, and PA: -0.15).

As this latter finding corresponds with earlier results among dentists (Gorter *et al.*, 1999a) it is possible that this constitutes a dental-specific deviation from the more general model of burnout. To explore this possibility, two alternative confirmatory models were fitted to establish if the goodness-of-fit of the best fitting model (the oblique three-factor, M_4) could be improved. In the first alternative model, item 20 was excluded from the analysis and item 11 loaded on EE instead of D (M_6). In the second alternative model, both items loaded on EE instead of D (M_7). Results are shown in table 3. Although in both studies χ^2 improved for M_6 and, more notably, M_7, goodness-of-fit did not meet critical standards. Therefore, M_4 can be maintained as best fitting model.

MBI SEQUENCE

The values of the goodness-of-fit indices are presented in table 4. Compared to the other models, model SM_2 clearly showed the least fit. In an absolute sense, the NNFI values of the remaining models can be considered too low to constitute an acceptable fit. These results correspond to those found among physiotherapists (De Vries, 2001), also included in table 4.

TABLE 4. SEQUENCE OF THE BURNOUT DIMENSIONS: STRUCTURAL MODELS OF THE UBOS-C (2000) FOR THE STUDIES IN 2000 AND 2001, AND PHYSIOTHERAPISTS (DE VRIES, 2001)

Model	χ^2	df	RMSEA	NNFI	CFI
Dentists, 2000					
SM_1	588.66	168	0.081	0.86	0.88
SM_2	690.59	168	0.084	0.83	0.85
SM_3	584.40	168	0.080	0.86	0.88
Dentists, 2001					
SM_1	702.18	168	0.085	0.86	0.88
SM_2	690.59	168	0.084	0.83	0.85
SM_3	724.40	168	0.089	0.86	0.88
Physiotherapists					
SM_1	1063.11	168	[a]	0.90	0.91
SM_2	1511.84	168	[a]	0.85	0.86
SM_3	1087.79	168	[a]	0.89	0.91

Note: χ^2: Chi-square goodness-of-fit index, df: degrees of freedom, RMSEA: Root Mean Square Error of Approximation, NNFI: Non-Normed Fit Index, CFI: Comparative Fit Index. SM_1: EE-D-PA (Maslach *et al.*, 1996), SM_2: D-PA-EE (Golembiewski & Munzenrider, 1988), SM_3: PA-EE-D (De Vries, 2001). [a]De Vries (2001) did not compute the RMSEA index.

Discussion

The purpose of this study was to elaborate on the use of the MBI-NL among entrepreneurs within health care. A first aim was to further strengthen the earlier findings about the usability of the MBI-NL among dentists. As hypothesized, both the results from a follow-up study, and a study among a new, independent sample of Dutch dentists, led to the conclusion that a three-factor model fitted the data best. Although some dental-specific deviations appeared to be present, confirmative factor analyses revealed no significant improvement after these variations were taken into account. A second aim was to examine the sequence of the three MBI-scales. To date, no studies exist that explore this issue in a sample of dentists. Results indicated that the D-PA-EE sequence (Golembiewski & Munzenrider, 1988) did not fit the data. Of the two alternative models, EE-D-PA (Maslach et al., 1996) showed the best fit.

The MBI was initially developed for research among human services. Of course, the dental profession clearly falls in the latter category. However, being entrepreneurs, the working conditions of dentists also differ from the typical 'people work' setting in some important ways. The dentist often works in isolated surroundings, is head of staff, and has to deal with restrictions and rules imposed by government and insurance companies. In the typical human service professions these issues are relevant to a lesser degree. Considering this, the large interscale correlation between EE and D is of interest. The intercorrelation found among dentists was similar to those found among physiotherapists and general practitioners. In the ways it is akin to entrepreneurship, the latter occupation can be considered comparable to that of the dentist. Furthermore, in an earlier study among dentists (Gorter *et al.*, 1999a), a very strong relation between EE and D was also demonstrated (i.e., a model consisting of the combination of EE and D versus PA fitted the data better than a model of EE versus the combination of D and PA). In contrast, the EE-D intercorrelation reported among other health care professions (Schaufeli & Van Dierendonck, 2000) was substantially lower. Perhaps the large entanglement of EE and D is a specific phenomenon within health care professions that have a more 'solitary' daily practice. Regrettably, the current data provide no clear explanation for these results.

Notwithstanding the above considerations, the results generally confirm the proposed overall three-factor structure of burnout. Reliability coefficients and interscale correlations proved to be comparable not only to the values given in the manual, but also in comparison with other solo-orientated care giving occupations like physiotherapists and general practitioners. Based on the results concerning the sequence of the MBI factors, a slight preference can be given to the original Maslach *et al.* (1996) model. More research seems necessary to further explore the issue of the sequence on the MBI subscales. Also, as Cordes *et al.* (1997, p.698) noted, the interpretation of models of structural equation modelling are not proof of causality. Rather, they may increase the plausibility of the model being tested while simultaneously decreasing the probability of alternative models. To this can be added that the results are strengthened by their confirmation in both, independent, samples.

With these findings it can be argued that issues concerning the use of the MBI in general should receive continued attention. As mentioned in the introduction, the origin of the MBI can be questioned, but the generalizability among entrepreneur-like, more solo-oriented health care occupations even more so. In future research, this distinction should not be neglected.

CHAPTER 3

On the phases of burnout: A longitudinal study using multiple imputation[4]

Summary – This study uses a longitudinal design to examine the sequence of the three subscales of the Maslach Burnout Inventory (MBI): emotional exhaustion (EE), depersonalisation (D), and personal accomplishment (PA). Special precaution was taken to address the issue of wave nonresponse, which is an ubiquitous problem within longitudinal research. Multiple imputation (MI) was used in completing the original data, thereby offering a more advanced approach than the often used case deletion (CD). Using Structural Equation Modelling (SEM), the fit of several chronological models proposed in earlier research was compared among a representative sample of Dutch dentists. Results indicate that the original model suggested by Maslach and Jackson (1981) (EE→D→PA) showed an adequate fit, although an alternative model (PA→EE→D) showed an even better fit. However, an exploratively constructed, and empirically based 'best fitting' model indicated that EE should not be discarded as an early sign of burnout. Also, PA varies in the position it takes in relation to EE.

The Maslach Burnout Inventory (MBI - Maslach et al., 1996) is the most widely used instrument to measure burnout in current scientific research. There are important practical reasons to examine the chronological sequence of the three MBI subscales (emotional exhaustion – EE, depersonalisation – D and personal accomplishment – PA). First, knowledge of the sequence of development of burnout implies knowledge on those factors that are probable to surface in the early stages of the onset of burnout. Such an early recognition of burnout is considered essential for possible intervention. Second, from a preventive point of view, efforts to avoid a possible burnout can be

[4] This chapter is submitted for publication.

concentrated on those factors that are known to develop first. By knowing the sequence of burnout early recognition and prevention can be facilitated (Brouwers, 2000; Van Dierendonck, 1997). Finally, knowledge on this sequence can help develop and empirically improve process models that can add to a further understanding of the antecedents and consequences of burnout (Lee & Ashforth, 1993, In: Van Dierendonck, 1997). In earlier research, structural equation modelling (SEM) was used to investigate the chronological order of the subscales. Although SEM is convenient for this purpose, a longitudinal design is necessary to rule out the reverse causation possibility (Cordes et al., 1997; Zapf, Dormann & Frese, 1996) and, overall, to make an empirically more viable point of chronology and causality.

Several models of sequence are proposed. First, the original EE→D→PA sequence proposed by Maslach and Jackson (1981) found some support in earlier research (e.g., Cordes *et al.*, 1997; De Vries, 2001). Second, the so-called progressive phase model (Golembiewski & Munzenrider, 1988) proposes a D→PA→EE sequence. Although the progressive phase model also found some evidence (e.g., Gryskiewicz & Buttner, 1992), it was severely criticized on methodological grounds by Leiter (1989). Third, in a study among physiotherapists, evidence was recently found for a sequence of PA→EE→D (De Vries, 2001). In addition to these three models, the current study will focus on an additional sequence. In a longitudinal study, Van Dierendonck, Schaufeli and Buunk (2001) report evidence for the sequence PA→D→EE among general physicians. Although conceptually this model constitutes a reversal of the Maslach *et al.* (1981) model, in a mathematical sense the two models are identical. As a result, structural equation modelling based on cross-sectional data would yield identical results; only in a longitudinal design these two models can be distinguished from each other. In short, the present study seeks not only to examine several models of burnout in a longitudinal setting, but it also seeks to extend the models that are compared.

Within the social sciences, and especially within longitudinal research, missing data are a ubiquitous problem. Modern missing data procedures are available that are considered to be superior to Case Deletion (CD, also known as listwise deletion and pairwise deletion). One such advanced procedure is Multiple Imputation (MI) (e.g.,

Schafer, 1997). MI deals with the problem by regressing the missing data on the observed data. Thus, in longitudinal research MI can be used to predict missing data in one wave on the basis of available data from earlier or later waves. MI also requires a weaker assumption regarding the missing data mechanism (i.e., it results in unbiased estimates when the data are at least MAR[5]) than naïve methods like CD, that assume MCAR (see, e.g., Smits, 2003). Moreover, contrary to ad hoc procedures such as CD, MI tends to reduce bias, even when the assumption of MAR is unrealistic (Schafer & Olsen, 1998). Finally, MI accounts for the uncertainty that is a result of the occurrence of missing values (Schafer & Graham, 2002).

In this study, the sequence of the three MBI subscales is examined using longitudinal data gathered among a representative group of Dutch dentists. Using SEM, several proposed models of sequence are compared. On the basis of results found earlier (e.g., Brouwers, 2000; De Vries, 2001), the original model proposed by Maslach and Jackson (1981) is expected to be the best fitting. Furthermore, in incorporating a technique of handling missing values, MI, this study aims to illustrate the preference that should be given to such methods over the widely used CD methods.

Material and methods

PARTICIPANTS AND PROCEDURE

Participants in this study were derived from the pool of dental practitioners registered in the files of Movir Insurance (which does include more than 77% of all active Dutch dentists). A random selection procedure was employed, using stratification for gender, region (twelve provinces) and age. At Wave 1, a total of 950 dentists was sent a questionnaire. At Wave 2 the same group of dentists was approached, excluding 65 dentists that had explicitly indicated to prefer not to participate any longer. Data-

[5] Rubin (1976) introduced a classification of the mechanisms that cause missing values. When the observed data are a completely random subsample of the hypothetically complete data, the data are Missing Completely At Random (MCAR). The second type of missing data mechanism is called Missing At Random (MAR), in which the missingness does not depend on the missing values but possibly on observed data. In the worst case, the missing data are dependent upon the values of the data that are missing; these data are described as Missing Not At Random (MNAR).

collection took place in March and April 1997 (Wave 1) and between April and June 2000 (Wave 2). The procedure included an announcement, two reminders, and if necessary a complete re-sending of the questionnaire (following recommendations by Dillman, 1978).

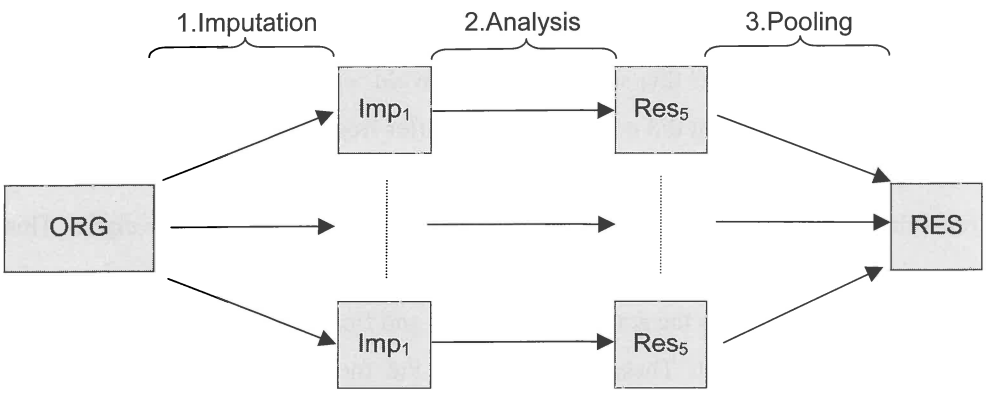
MATERIAL

A Dutch version of the MBI was used to measure burnout (Schaufeli & Van Dierendonck, 2000). Like the MBI-human services survey (MBI-HSS - Maslach et al., 1996), this instrument consists of the three subscales: EE, D and PA. EE consists of eight items (e.g., 'I feel emotionally drained from my work'), D consists of five items (e.g., 'I don't really care what happens to some patients') and PA consists of seven items (e.g., 'I deal very effectively with the problems of my patients'). Each of the twenty items can be answered on a 7-point Likert scale, ranging from 0 ('never') to 6 ('every day'). With the publication of a new manual, this Dutch questionnaire was renamed Utrechtse Burnout Schaal (UBOS - Schaufeli & Van Dierendonck, 2000).

OVERVIEW: THE ANALYSES OF MISSING DATA

In longitudinal studies participants may be present in some waves of data collection and missing in others. This kind of missingness may be called wave nonresponse (Schafer & Graham, 2002). To adequately represent the uncertainty of its values, missing data should be imputed (filled in) more than once. Therefore, before an imputed value can be used as observed value, this uncertainty should be accounted for. Using MI, a missing value is replaced by $m>1$ possible values drawn from a distribution of plausible values; the variability among the values provides a measure of the uncertainty with which the imputed values are derived from the observed ones (Schafer & Olsen, 1998). Application of MI requires three steps as illustrated in Figure 1: imputation, statistical analysis and pooling. The implementation of these three steps for the current study is discussed below. For a thorough introduction the reader is referred to Schafer and Graham (2002).

FIGURE 1. THE THREE PHASES OF MULTIPLE IMPUTATION: 1.IMPUTATION, 2.ANALYSIS, AND 3.POOLING.



ORG = original, incomplete data; Imp_1–Imp_5 = Imputed datasets; Res_1–Res_5 = Analysis results from Imp_1–Imp_5; RES = final result (pooling Res_1–Res_5).

Imputation of missing values

A procedure called Data Augmentation (DA) was used to create 5 completed data sets. Using the software program NORM (Schafer, 1999; Schafer & Olsen, 1998), the imputation model included the (incomplete) item scores of the burnout scale from Wave 1 and Wave 2, and the completely observed variables gender and age. These last two variables were added to preserve the structure of the data.

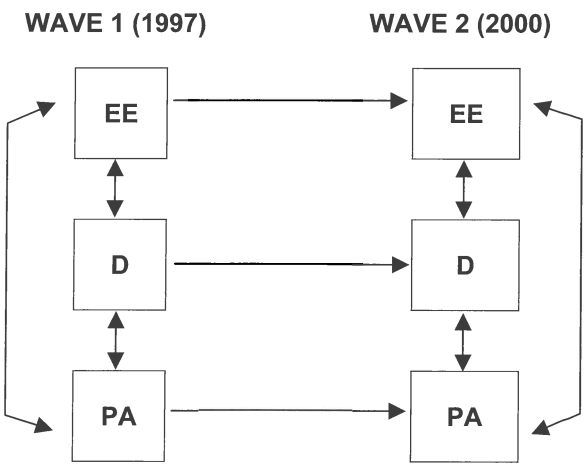
Statistical analysis

Psychometric aspects of the MBI subscales are examined by calculating interscale correlations and internal consistencies (Cronbach's alpha). To determine the sequence of the three burnout components, thereby answering the main research question, several two-wave longitudinal models were compared in terms of model fit using the program LISREL 8.54 (Jöreskog & Sörbom, 1996)[6]. Analyses consisted of three distinguishable steps. First, a stability model (M_0), shown in figure 2, was tested in which the three subscales were allowed to correlate with each other within each wave

[6] Within SEM missing values can also be dealt with using Full Information Maximum Likelihood (FIML, see, e.g., Enders, 2001). In many situations, the performance of MI and FIML will be essentially identical (Schafer, 2001). Here, MI was preferred because of the straightforward use of auxiliary variables for the estimation of the missing values and its ability to study rates of missing information (Collins, Schafer & Kam, 2001; Schafer & Graham, 2002).

and in which the factors at Wave 2 were regressed on themselves at Wave 1. The purpose of the second step was to attain a best fitting model. To this end, a stepwise approach was followed, which started with a saturated model consisting of all possible longitudinal relations. In this saturated model Wald tests were used to identify the longitudinal relations that did not significantly differ from zero. In several consecutive steps, these non-significant regression weights were fixed to zero (thereby effectively removing this relation), until there remained only significant regression weights. This procedure results in a (parsimonious) model that, purely on an empirical basis, can be considered best fitting to the data (M_1). In a third and final step, four models described in literature were fitted. These models were: the model describing the sequence EE→D→PA (M_2) proposed by Maslach and Jackson (1981); the model suggesting the sequence D→PA→EE (M_3) proposed by Golembiewski and Munzenrider (1988); the model containing the sequence PA→D→EE (M_4) proposed by Van Dierendonck et al. (2001); and a model with the sequence PA→EE→D (M_5), proposed by De Vries (2001). Because the same items were administered twice, the residuals of the paired items are allowed to covariate over time in all models.

FIGURE 2: TWO-WAVE LONGITUDINAL DESIGN, STABILITY MODEL.



EE = emotional exhaustion; D = depersonalisation; PA = personal accomplishment.

The goodness-of-fit of models was assessed by several widely used absolute and relative indices. The absolute fit indices were the chi-square goodness-of-fit index (χ^2) with the accompanying degrees of freedom and the Root Mean Square Error of Approximation (RMSEA). A lower value of chi-square indicates a better fit of the model. The value of the RMSEA should approach zero, whereby values smaller than 0.06 are considered indicative of acceptable model fit (Hu & Bentler, 1999). The fit indices Non-Normed Fit Index (NNFI) and the Comparative Fit Index (CFI) were included to test the relative fit of models. Values for the NNFI and CFI between 0.95 and 1.00 can be seen as indicative of a good fit and values of 0.90 or higher are indicative of an acceptable fit (Bentler, 1990). Furthermore, the fit of models was assessed by means of Akaike's Information Criterion (AIC) and the Consistent Akaike's Information Criterion (CAIC) (cf., Jöreskog & Sörbom, 2002). The relative fit of models that differ in restrictiveness can be assessed with these indices, with lower values of AIC and CAIC indicating better fit. Strictly speaking, the data are not normally distributed due to the use of Likert-scales. Nevertheless, the use of maximum likelihood estimation is warranted in light of its robustness to such a form of non-normality (cf., Dolan, 1994).

The assumption of measurement invariance is an essential aspect of longitudinal research (Meredith & Horn, 2001). In the comparison of measurements in both waves, it is important to establish that the items measure the same construct at Wave 1 and Wave 2, and that differences in item scores over time can thus be attributed to differences at the level of the constructs (i.e., the factors in the factor model). Measurement invariance can be investigated by testing for strong factorial invariance over time, which involves restricting measurement parameters to be equal over time. Meredith (1993) has shown that if factor loadings and measurement intercepts are time-invariant, measurement invariance holds (cf., Meredith & Horn, 2001). Note that, when testing for strong factorial invariance over time, factor (co)variances and factor means are allowed to differ over time.

Pooling

After creating 5 imputed versions of the data sets, and analysis of each separate data set, the pooling step consists of simply computing the average of the estimates in each

data file (Rubin, 1987). The uncertainty (variance) associated with the parameter in question has two components. The average within-imputation variance is the average of the parameter variances in the multiple data sets. The between-imputation variance is the variance of the parameter estimate over the multiple data sets. To assess the uncertainty due to the occurrence of missing values, the rate of missing information was studied. This estimate measures the increase in sample variance of a parameter due to missing values; it is determined by the rate and pattern of missing values and the ability of observed values to predict missing values successfully. It may be greater or smaller than the rate of missing values in any given problem (Schafer & Graham, 2002). For example, for data containing highly correlated variables, the missing information is expected to be lower than the actual rate of missing values and. For panel data suffering from definite dropout, missing information associated with variables in most recent waves is expected to be lower than the total rate of missing values. In practice, however, rates of missing values are often used as a base rate for the fractions of missing information (Schafer, 1997, p. 129). An MI-inference of all estimated parameters would go beyond the scope of this study. Therefore, to illustrate the impact of the occurrence of nonresponse on our outcomes, only the results of the MI-inference for the χ^2 fit statistics of the theoretical models compared in this study are provided[7]. As advised by Schafer (1999), one imputed data file was randomly selected to form the empirically based 'best-fitting' model (M_1, described above). The resulting model was subsequently fitted on the four remaining imputed data sets.

Results

RESPONSE

Of the 950 dentists that had received a questionnaire at Wave 1, 735 responded (response rate 77%). At Wave 2, 22 of the 885 questionnaires that were sent proved undeliverable; 493 usable questionnaires were returned (57%). Each of these samples could be considered to be representative for the general population of dental

[7] Results of the MI-inferences of all parameters are available when requested.

practitioners in The Netherlands, as is detailed elsewhere (see Gorter, Albrecht, Hoogstraten & Eijkman, 1999c; Te Brake, Bloemendal & Hoogstraten, 2003 for the 1997 and 2000 studies, respectively). At each of the studies, a number of dentists had removed their personal identification number, thereby assuring themselves of anonymity. However, in merging the datasets of the two studies, these respondents could not be included. As a result, a total of 30 respondents from the 1997 study (4.3%) and 18 respondents from the 2000 study (3.7%) where excluded. Burnout levels (mean EE, D and PA scores) within these excluded subgroups proved not to differ from the total means within studies, which makes the assumption tenable that deletion of these subjects will not influence the current analyses.

Within any two-wave longitudinal study, three types of 'wave nonresponse' (Schafer & Graham, 2002) can be distinguished: (1) subjects that responded at Wave 1, but not at Wave 2 (N=251); (2) subjects responding at Wave 2, but not at Wave 1 (N=67); and (3) subjects that responded at both measuring points (N=408). When CD methods are used, only respondents from the latter group would be included in analyses. The (incomplete) results of a total of 318 respondents would then be ignored whereas using MI, all 726 respondents are included in the analyses. MI reconstructs the missing values on the basis of observed values[8]. In Wave 1 9% (100×67/726) of the data was missing while in Wave 2 35% (100×251/726) of the respondents were missing. The overall rate of missing values in the data file was 22% (0.5×9%+0.5×35%).

Multiple Imputation

The EM algorithm converged in 42 iterations. It appeared that 42 cycles of DA sufficed to converge in distribution (Schafer, 1998). For an extra margin of safety, it was decided to carry out DA for 1000 cycles and generating imputations at every 200th cycle. All the estimates of means and (co)variances of the data showed good convergence behaviour.

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[8] Naturally, dentists who did not respond in either wave were omitted from the analysis because they contributed no information for the statistical inference (e.g., Schafer, 1997).

PSYCHOMETRIC RESULTS

Table 1 shows the interscale correlations for both measurement points for the imputed dataset. Interscale correlations show the same pattern as reported in the UBOS manual (Schaufeli & Van Dierendonck, 2000), although the high EE-D correlation both at Wave 1 and Wave 2 are higher (manual norm for EE-D is 0.49). This supports findings found earlier among dentists of relatively high correlations between EE and D (Gorter et al., 1999a). The internal consistencies, also reported in table 1, are consistent with figures reported in the UBOS manual.

TABLE 1. MI-INFERENCES OF INTERSCALE CORRELATIONS AND (DIAGONALLY) INTERNAL CONSISTENCIES (CRONBACH'S ALPHA) FOR THE THREE MBI SUBSCALES MEASURED AT WAVE 1 (1997) AND WAVE 2 (2000) (N=726)

MBI subscale	EE_1	D_1	PA_1	EE_2	D_2	PA_2
emotional exhaustion$_{wave1}$	0.89					
depersonalisation$_{wave1}$	0.60	0.70				
personal accomplishment$_{wave1}$	-0.22	-0.37	0.80			
emotional exhaustion$_{wave2}$	0.70	0.43	-0.16	0.90		
depersonalisation$_{wave2}$	0.49	0.59	-0.31	0.65	0.74	
personal accomplishment$_{wave2}$	-0.20	-0.22	0.51	-0.33	-0.33	0.80

Note: All correlations are significant at the 0.01 level (2-tailed).

MISSING INFORMATION OF SEM MODELS

Table 2 reports the estimate of the chi-square fit statistic of the six structural models resulting from the matching MI-inferences. The fit statistics of the six models had percentages of missing information ranging from 37% to 41% with a mean of 39%. Consequently, these estimates are rather closer to the percentage of missing values in Wave 2 (35%) than to the overall percentage of missing values (22%). The disproportionate distribution of missing values over the two waves probably accounts for this. Many parameters of the estimated structural models are functions of variables in both waves. Therefore, it is very likely that these estimates (and consequently the fit statistics) suffered proportionally to the higher rate of missing values of the second wave. Even though the percentage of missing information is somewhat higher than expected, a value of 40% is generally considered to be a moderate rate (e.g., Schafer, 1997, p.137).

TABLE 2. TWO-WAVE LONGITUDINAL MODELS

Model	χ^2	df	RMSEA	NNFI	CFI	AIC	CAIC
M_0	3040.30	739	0.0663	0.9482	0.951	3334	4010
M_1	3049.28	743	0.0662	0.9484	0.951	3341	3995
M_2	3051.98	743	0.0663	0.9483	0.951	3348	4001
M_3	3057.28	743	0.0664	0.9482	0.953	3350	4004
M_4	3057.10	743	0.0663	0.9482	0.951	3350	4003
M_5	3054.12	743	0.0664	0.9483	0.951	3353	4006

Note: χ^2 = Chi-square goodness-of-fit index, df = degrees of freedom, RMSEA = Root Mean Square Error of Approximation, NNFI = Non-Normed Fit Index, CFI = Comparative Fit Index. AIC = Akaike's Information Criterion, CAIC = Consistent Akaike's Information Criterion. M_0 = stability model (see Figure 2), M_1 = EE→D & EE→PA, M_2 = EE→D→PA (Maslach & Jackson, 1981), M_3 = D→PA→EE (Golembiewski & Munzenrider, 1988), M_4 = PA→D→EE (Van Dierendonck *et al.*, 2001), M_5 = PA→EE→D (De Vries, 2001).

FACTORIAL INVARIANCE OVER TIME

To assess the assumption of measurement invariance, the tenability of strong factorial invariance was examined. Restricting factor loadings to be time-invariant, resulted in a significant increase in chi-square ($\Delta\chi^2(17)=50.0$). However, this restriction did not lead to a noticeable deterioration in any of the other fit measures. For instance, the RMSEA remained 0.065 over all models, while the NNFI showed a slight improvement from 0.948 in the model with no restrictions to 0.949 in the model with time-invariant factor loadings. Therefore, this restriction on factor loadings appears tenable. Restricting the item intercepts (and freeing the factor means on the second occasion) also resulted in a significant increase in chi-square ($\Delta\chi^2(17)=93.4$). But, again, the other fit indices indicated that this restriction was tenable. For instance, the NNFI of the strong factorial invariance model was identical to the NNFI value model without time-restrictions (0.948). The CFI showed a small drop (from 0.953 to 0.951), whereas the CAIC indicated that the restrictions for strong factorial invariance were tenable (CAIC changes from 4057 to 3968). Because restrictions on measurement parameters over time did not result in a clear deterioration in model fit, it was concluded that strong factorial invariance was tenable over time. Therefore, the model with time-invariant intercepts and time-invariant factor-loadings was used in all remaining analyses.

STRUCTURAL CONFIRMATIVE ANALYSIS

The iterative procedure used to exploratively produce a best fitting model (M_1) resulted in a model in which EE precedes both D and PA directly. Thus, high levels of EE lead to higher levels of D and PA independently. The goodness-of-fit indices for all models are presented in table 2. Although the RMSEA is somewhat higher than the rule-of-thumb value of 0.06, the CFI and NNFI indicate that all models show sufficient fit. The parameter estimates of the beta-weights (for the saturated model) are given in table 3. As can be seen by the Wald tests, three paths are not significantly different from zero (i.e., absolute Z-value smaller than 1.96, $p>0.05$): PA→EE, D→EE, and D→PA. This suggests that these paths do not add to the prediction of the components of burnout in 2000.

TABLE 3. PARAMETER ESTIMATES OF THE BETA-WEIGHTS FOR THE SATURATED MODEL (M_0)

		EE 1997	D 1997	PA 1997
EE 2000	beta estimate	0.832	-0.212	-0.067
	SE	0.056	0.146	0.048
	Z-value	14.870**	-1.448	-0.859
D 2000	beta estimate	0.115	0.478	-0.101
	SE	0.033	0.086	0.047
	Z-value	3.448**	5.563**	-2.177*
PA 2000	beta estimate	-0.065	0.077	0.528
	SE	0.032	0.082	0.046
	Z-value	-2.028*	0.915	11.474**

Note: EE = emotional exhaustion; D = depersonalisation; PA = personal accomplishment. *p<0.05; **p<0.01

Notwithstanding the evident fit of all models, any clear conclusions concerning the best-fitting model are precluded because of the minute differences of the fit indices between models. An explanation for these small differences can be found in the large number of parameters included in the complete model. Since the measurement invariant longitudinal factor model fits the data quite well, it is warranted to reduce the number of parameters in the compared models by using the scale scores instead of the raw item scores.

The results of the path-analysis using scale scores are reported in table 4. In terms of RMSEA the only model that comes close to the acceptable fit (RMSEA<0.06) is model M_1. Nevertheless, for all models, the relative fit indices NNFI and CFI indicate acceptable (i.e., >0.90) to good (>0.95) fit. What is more, fit

indices are far less homogeneous between the models, which allows for a distinction between models. Not surprisingly, model M_1 shows the overall best fit. Of the remaining models, however, models M_2 and M_5 stand out in having the relative best fit, whilst showing a good fit according to the NNFI and CFI measures. Of these two models, M_5 should be preferred; for this model, all fit indices indicate the best fit.

TABLE 4. TWO-WAVE LONGITUDINAL MODELS, USING SCALE MEANS FOR ANALYSES

Model	χ^2	df	RMSEA	NNFI	CFI	AIC	CAIC
M_1	18.57	4	0.0689	0.9742	0.9928	53	147
M_2	26.42	4	0.0870	0.9596	0.9894	60	155
M_3	57.41	4	0.1334	0.9206	0.9742	90	185
M_4	38.58	4	0.1062	0.9382	0.9836	72	167
M_5	24.11	4	0.0824	0.9640	0.9904	58	153
M_{1_REV}	2.73	3	0.0082	1.001	0.9998	39	139

Note: Scale mean scores for EE, D and PA were used in analyses. χ^2 = Chi-square goodness-of-fit index, df = degrees of freedom, RMSEA = Root Mean Square Error of Approximation, NNFI = Non-Normed Fit Index, CFI = Comparative Fit Index. AIC = Akaike's Information Criterion, CAIC = Consistent Akaike's Information Criterion. M_0 = stability model (see Figure 2), M_1 = EE→D & EE→PA, M_2 = EE→D→PA (Maslach & Jackson, 1981), M_3 = D→PA→EE (Golembiewski & Munzenrider, 1988), M_4 = PA→D→EE (Van Dierendonck *et al.*, 2001), M_5 = PA→EE→D (De Vries, 2001), M_{1_REV} = alternative explorative model, based on scale means: EE→D & EE→PA→D.

As a final explorative exercise, the iterative procedure used to produce M_1 was repeated using the scale means as input values. The procedure resulted in a revised version of M_1, which combined EE→D with EE→PA→D (effectively adding the PA→D path to the original M_1). The model fit indices for this model (M_{1_REV}) are also included in table 4. Results on M_{1_REV} not only show an extremely good absolute fit, but also an exceptionally better fit to the data relative to the other models.

Discussion

The first purpose of this study was to examine the sequence of the three MBI subscales: EE, D and PA in a longitudinal setting. Two methods were used to find the 'best sequence'. Firstly, a number of models specifically named in literature were compared, including a model that can only be tested in a longitudinal setting the model proposed by Van Dierendonck et al. (2001). Secondly, a completely

empirically based, best-fitting model was examined. An additional purpose of this study was to describe a more elaborate handling of missing values than is commonly used in longitudinal research. Results indicate that the models proposed by Golembiewski and Munzenrider (1988) and Van Dierendonck et al. (2001) do not adequately fit the data. In contrast, both the model proposed by Maslach and Jackson (1981), as well as an alternative found among physiotherapists (De Vries, 2001) were found to have a good fit on the data. Furthermore, the best-fitting models indicated that among dentists, EE is most appropriate aspect to be considered an early sign of burnout.

Of the two models that showed a good fit, current results indicate a slight preference for the PA→EE→D model. De Vries (2001), when originally proposing this model, did not explicitly name any theoretical or empirical reasons for including this model, other than it being a variation of the Van Dierendonck *et al.* (2001) model, which also places PA as the first aspect to be affected in the process of burnout. Regardless of its exact origin, it is interesting to see that this model, originally found among physiotherapists, is also found to have the best fit among dentists. In a number of work-related aspects, dental practitioners can be considered comparable to physiotherapists. Within general health care, both professions can be considered extraordinary because of their entrepreneur-like position. Also, both dentists and physiotherapists have to deal with patients on a daily basis, often within a relatively confined working environment. Finally, both rely to a large degree on manual abilities in daily work. It is therefore of interest to find that in both professions evidence was found for PA as a firstly affected burnout component.

PA has been compared to feelings of competence, mastery and goal orientation: "Personal Accomplishment is defined as the evaluation of the relational skills in handling recipients, which may influence self-efficacy beliefs regarding future performance" (Van Dierendonck *et al.*, 2001, p. 49). It is imaginable that such (general) beliefs translate to (more specific) feelings about ones manual competence. However, given the central position of manual abilities in dental education it seems more realistic to assume that these manual competences are a relatively stable aspect within dental work, while, indeed, the relational aspects are much more susceptible to

outside influences. Moreover, the items on the PA scale do not relate to any specific manual skills (which are very important in daily work for dentists and physiotherapists alike). In contrast, the PA items have much more to do with social and emotional skills (De Vries, 2001), aspects for which the average dentists is often less adequately trained. In this line of thought, it is to be assumed that PA is influenced in the early stages of the onset of burnout.

Although intuitively intriguing, this interpretation is not supported by the empirically found 'best fitting' models, which indicate that EE not only leads to an increase in D, but also *directly* leads to a decrease in PA (as opposed to the 'route' via D), thereby indicating a relation between the two. This contradicts suggestions made elsewhere, where it was suggested that PA has a relatively independent role compared to EE and D (e.g., Lee & Ashforth, 1996; Leiter, 1993; Maslach *et al.*, 2001). A possible explanation for this unusual outcome may be found in the fact that only causal relations are tested. Synchronous development of EE and D are not explicitly tested but such a (mutual) development could be at work. Such inference is supported by the relatively high correlation between EE and D that was found among dentists in this study (see table 1) as well as in earlier research (Gorter *et al.*, 1999a). Another explanation can perhaps be found in the time-window of 3 years that was used in this study. It should be stressed that the time between measurement points probably can be of great importance for the process that is at work. The hypothesis that different processes are working in the short term and in the long term cannot be discarded. In the same vein, the current study made use of two measuring points. In future research, three measuring point would be advisable for the fitting of these models. Furthermore, no so-called third variables were included in the design. Inclusion of such variables would generally strengthen the causal inference (Zapf *et al.*, 1996), but they could also shed more light on the relation between EE and PA.

Of the theoretically proposed models, the results point to, but do not clearly differentiate between, the EE→D→PA model by Maslach *et al.* (1996) and the PA→EE→D model by De Vries (2001). Nevertheless, some important conclusions can be drawn that should be considered relatively exclusive for the setting of health care entrepreneurs (e.g., dentists and physiotherapists). Both early signs of exhaustion, as

well as feelings of reduced personal accomplishment should be taken as early warning signs of burnout. However, findings on both best-fitting models indicate exhaustion to be the first aspect of the burnout process, and that exhaustion, in turn, is followed by reduced feelings of personal accomplishment and, *at the same time*, an attitudinal response in the form of depersonalisation. Thus on these results, it seems that exhaustion is most likely to be the first effect of a pending burnout. As EE is traditionally seen as an orthodox response to actual work related stress, specific stress related training programs are the most appropriate aspect to be addressed with professional entrepreneurs in health care.

The second purpose of this study beholds an additional practical implication of this study, and lies in the methodological issues concerning longitudinal research. For one, the (often implicitly made) implicit assumption of measurement invariance was explicitly tested. It was found that the MBI was indeed measurement invariant over time. This suggests that the items of the MBI measure the same attributes in an equivalent manner in the two waves of this study. This clearly adds to the validity of the MBI. For instance, measurement invariance over time of the MBI suggests the absence of any re-test effects. Secondly, even though nonresponse is omnipresent, many recent longitudinal studies on burnout and work-related stress do not provide information on the exact handling of missing values (e.g., Burke & Greenglass, 1995; Deary, Watson & Hogston, 2003; Savicki & Cooley, 1994; Van der Ploeg & Kleber, 2003). Others resort to CD (e.g., Bakker, Schaufeli, Sixma, Bosveld & Van Dierendonck, 2000b; Houkes, Janssen, De Jonge & Bakker, 2003), probably because CD is the default method for dealing with incomplete data in many statistical software packages. However, CD may only yield unbiased estimates when the missing data comply with the strict assumption of MCAR (e.g., Smits, Mellenbergh & Vorst, 2002), and even when MCAR holds, CD should still be considered inefficient (Schafer & Graham, 2002). Moreover, CD does not properly account for the uncertainty that is associated with the occurrence of missing data (e.g., Little & Schenker, 1995).

The application of the MI-inference ensured better parameter estimates than when applying naïve methods like CD. In an extra analysis, to specifically test the

assumption of MCAR, Little's test for MCAR (Little, 1988) showed that the data where not MCAR ($\chi^2(950)=1054.73$, $p=0.010$). Thus, in the current research, the assumption of CD would be violated and would have led to biased estimates. For future longitudinal research it is recommended also to check for MCAR; when this assumption is not met, the use of CD should be avoided. Furthermore, the MI-inference gave insight in the effect of the occurrence of missing values on the uncertainty associated with the estimated models: 40% of the variance of the fit statistics was a result of the nonresponse. This percentage was closer to the percentage of missing values in the second wave than the overall percentage of missing values. This outcome clearly signifies that when studying the phases of burnout (i.e., modelling processes through time) not only the use of a longitudinal design should be stressed, but also every effort should be taken have equal rates of (non)response in each wave.

CHAPTER 4

Gender differences in burnout among Dutch dentists[9]

Summary – Differences between the sexes in the manifestation of burnout have been reported for different occupational groups. Although some gender-specific explanations for this finding have been forwarded, there is a paucity of studies in which the relation with other work-related gender differences is examined. The objective of this study was to analyze gender differences in burnout among dentists and to identify possible concomitant factors. Male (N=411) and female (N=81) Dutch dentists filled out the Dutch version of the Maslach Burnout Inventory (MBI) together with several health and work-related questionnaires. Results showed male dentists to report a higher score on the depersonalisation dimension of the MBI than did female dentists. No gender differences were found on the other dimensions (i.e., emotional exhaustion and personal accomplishment). Moreover, no gender-related differences in experienced work-stress or health-related aspects were found. It *was* found, however, that male dentists put in more working hours and see more patients per week when compared to female dentists. Also, a difference in mean age was found. Our main finding was that the difference in depersonalisation disappeared when controlling for working hours and age. Gender differences in burnout among dentists do exist. However, our results indicate that underlying factors, such as working hours, have a profound effect on these differences. These results can have direct practical consequences, for instance in distinguishing between groups concerning the way burnout scores should be interpreted.

Differences between the sexes in the response and exposure to work-related stress have repeatedly been the topic of research (e.g., Cleveland, Stockdale & Murphy, 2000; Mottaz, 1986; Roxburgh, 1996). Most studies indicate that women differ on the

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[9] This chapter has been published as: Te Brake, JHM, Bloemendal, E, & Hoogstraten, J (2003). Gender differences in burnout among Dutch dentists. *Community Dentistry and Oral Epidemiology*, *31*, 321-327.

aspects they find stressful as well as in the way they cope with these stressors. However, a problem with many of these studies is that they do not control for variation in occupation, status, and life circumstances; all these aspects being equal, the dissimilarity in aspirations may not be as noticeable (Cherniss, 1995, p.95-96).

As burnout is considered to be a response to chronic, work-related stress, it is to be expected that gender differences in work-related stress also play a role in its onset and development. The instrument most widely used to study burnout is the Maslach Burnout Inventory (MBI) (Maslach *et al.*, 1996). In the research tradition of the MBI, burnout is considered to be a result of working with clients or patients, its core symptoms being a feeling of emotional exhaustion (EE) and the development of a negative, cynical attitude about the recipients of one's service or care (depersonalisation – D). A third component concerns the development of negative attitudes towards oneself in relation to the job (reduced personal accomplishment – PA).

Studies investigating gender differences in burnout have revealed men to score significantly higher on D (Schaufeli & Enzmann, 1998, p. 76). In the manual of the Dutch version of the MBI, this consistent finding resulted in the decision to use different norm scores for men and women on the D scale (Schaufeli & Van Dierendonck, 2000). As a possible explanation for this distinction the authors point to contemporary gender stereotypes, in which men are both more instrumental in dealing with problems and more detached toward patients than women. Of course, this line of reasoning in itself can be considered stereotypical. Mottaz (1986) observed that there is a general tendency in literature to explain differences in work-related sentiments and values to gender *per se*, while there could easily be other factors at work that are not necessarily linked to gender and can vary over different situations. In the same vein, and in line with the observations by Cherniss (1995) mentioned above, there is an obvious possibility that the reported difference on the D scale can be explained by other associated factors. For example, Newton, Thorogood and Gibbons (2000) found differences between male and female dentists-general practitioner in ownership of practice: men more often than women were the sole proprietors of a dental practice.

In this study, we will address this issue by comparing the burnout scores of male and female dentists from a representative group of Dutch dentists and examining the relationship between possible differences in burnout score and a number of associated factors. A first aim was to analyze gender differences in burnout among Dutch dentists using the Dutch version of the MBI. In line with the consistent earlier findings among other occupations (Schaufeli & Van Dierendonck, 2000, p.14), it was hypothesized that male and female dentists will differ only in their score on the D scale of the MBI, and not on EE and PA. A second, and possibly more important aim was to examine the influence of several concomitant aspects on this difference, thereby revealing potential underlying reasons for gender differences in burnout.

Material and methods

Participants and procedure

The respondents in the current study already participated in an initial study on work stress among dentists conducted in 1997 (Gorter, 2000). At that time, a representative group of dentists was approached (controlling for variables gender, age and region). For the present study the dentists that had previously indicated not willing to participate were excluded. This resulted in a total group of 885 dentists that was sent an extensive questionnaire. Adhering to the recommendations by Dillman (1978), the procedure included an announcement, several reminders, and a complete re-sending of the questionnaire when there was no response. As an incentive to return the questionnaire, each participant received a book about ethics in dentistry.

Material

Burnout was measured using the Utrechtse Burnout Schaal (UBOS-C), a Dutch version of the MBI-HSS, developed by Schaufeli and Van Dierendonck (2000). The UBOS-C consists of 20 items to be answered on a seven-point Likert scale, ranging from 0 ('never') to 6 ('every day'). Three subscales scores can be acquired: EE (8 items), D (5 items) and PA (7 items). Examples of items on each subscale are: "I feel emotionally drained from my work" (EE), "I don't really care what happens to some

patients" (D), and "I deal very effectively with the problems of my patients" (PA). Research has indicated the MBI-NL to be a suitable instrument for administration among dentists (Gorter et al., 1999a).

A shortened version of the Dentists' Experienced Work Stress Scale (DEWSS) was used to measure experienced work stress. The original DEWSS was developed by Gorter, Albrecht, Hoogstraten and Eijkman (1998) and contained 94 items. Based on the results of factor analysis and (inter)correlations, the number of items was reduced to 73, which could be clustered into six subscales; Work Pressure (WP – 6 items), Work Contents (WC – 17 items), Career Perspective (CP – 14 items), Financial Aspects (FA – 16 items), Patient contacts (PC – 14 items) and (the entanglement of work and) Private Life (PL – 6 items). An example of a (Work Pressure) item is: "To what extent to you feel burdened by the amount of work?" The respondent was asked to answer using a 5-point Likert scale, ranging from 1 'no pressure' to 5 'very strong pressure.'

Health complaints were measured using the Vragenlijst Onderzoek Ervaren Gezondheid (VOEG), a Dutch health questionnaire consisting of 13 dichotomous (yes/no) items on fatigue, back pain, and other health complaints (Van Sonsbeek, 1990). An example of an item is: "Do you often have complaints about pain in bones or muscles?" Methodological qualities are known to be satisfactory (Joosten & Drop, 1987). Added to the VOEG were two dichotomous items on sleeping problems and eye complaints. Furthermore, an item on the assessment of one's general health was included which could be answered on a five-point Likert scale ranging from 'very good' to 'bad'.

Several more general and socio-demographic aspects were also included in the questionnaire. These included age, working hours (either at the practice or administrative), type of insurance of patients (sick fund or private insurance), number of hours spent on relaxation, number of patients treated, civil status, and membership of professional associations. The respondent was also asked if he or she a) (had) conducted post-graduate courses; b) in recent years had shown an interest in vacancies outside the practice; and c) had recently taken steps to enhance the working conditions in the practice.

STATISTICAL ANALYSIS

Mean scores were calculated for the three UBOS-C scales (EE, D, and PA) and for the six DEWSS-scales (WP, WC, CP, FA, PC, and PL). Differences in mean scores were assessed using multivariate analysis of variance (using SPSS's GLM) and Student's t-tests. For tests of proportions, chi-square statistics were calculated, in the case of 2×2 tables using a correction for continuity (e.g., Siegel & Castellan, 1988, p.76). Where appropriate, adjusted alpha levels were computed using the Bonferroni-Holm procedure (Holland & DiPonzio Copenhaver, 1988).

Based on our initial findings, variables on which gender differences existed were selected as possible concomitant variables. To analyze their influence on burnout, covariance analysis was done. Additionally, the influence of these variables on burnout was investigated by categorizing each variable, followed by a per-category analysis using Student's t-tests with corrected alpha levels (Holland & DiPonzio Copenhaver, 1988). In doing so, an alternative, more methodological method of examining the influence of concomitant factors on burnout was employed to ensure a well-founded conclusion.

Results

RESPONSE

Of the 885 questionnaires that were sent in 2000, 22 proved undeliverable. A total of 493 (57.1%) usable questionnaires were returned. Some of these dentists were excluded from the current study because they had participated in an intervention study (Te Brake et al., 2001), which had included two additional measurements and could well have a considerable effect on the mean burnout score. A research group of 433 dentists remained, consisting of 359 men (83.1%) and 73 women (16.9%) (gender of one respondent was unknown). Mean age in this group was 45.8 year. A comparison of distribution of gender, age, and region proved no deviations from the general population of Dutch dentists.

BURNOUT

Table 1 presents the mean scores for each of the three burnout-scales for men and women. Results of a MANOVA indicated men to have a higher overall mean score on these scales ($F(3,420)=3.49$, $p=0.016$). Univariate analysis revealed this to be true for the D scale only ($F(1,422)=6.84$, $p=0.009$); no significant gender differences were found on the EE and PA scale.

TABLE 1. MEAN BURNOUT SCORES AND STANDARD DEVIATIONS FOR MEN AND WOMEN

		Men (N=351)		Women (N=73)	
		M	SD	M	SD
Emotional exhaustion	F(1,422)=0.46, n.s.	1.58	1.01	1.49	0.94
Depersonalisation	F(1,422)=6.84, p=0.009	1.23	0.79	0.97	0.62
Personal accomplishment	F(1,422)=0.81, n.s	4.37	0.76	4.28	0.84

WORK STRESS

Explorative factor analysis of the 73 items revealed the six factors that are shown in table 2, which also displays Cronbach's alpha for each scale. Internal consistency proved to be satisfactory (>0.84), and all items contributed to the internal consistency of the scales. A MANOVA was used to examine differences in work stress rated by men and women. Although a MANOVA indicated a multivariate effect ($F(6,421)=2.24$, $p=0.039$), univariate tests did not find significant differences on any of the six DEWSS scales, see table 2.

TABLE 2. DEWSS: INTERNAL CONSISTENCY, MEAN SCORES, STANDARD DEVIATIONS, AND UNIVARIATE STATISTICS

		Men (N=356)		Women (N=72)		Univariate st.	
	α	Mean	SD	Mean	SD	F	p
Work pressure	0.84	2.69	0.82	2.58	0.75	1.137	0.287
Work contents	0.91	2.11	0.58	2.21	0.63	1.832	0.177
Career perspective	0.93	1.87	0.69	1.87	0.68	0.002	0.965
Financial aspects	0.94	2.45	0.81	2.37	0.90	0.479	0.489
Patient contacts	0.93	2.45	0.78	2.46	0.79	0.010	0.920
Private life	0.87	2.12	0.83	2.25	0.84	1.451	0.229

HEALTH

The incidence of health complaints of men and women were analyzed using chi-square. Although women report more problems about the occurrence of headaches and

backaches ($\chi^2(1)=5.22$, p=0.022 and $\chi^2(1)=4.78$, p=0.029, respectively), no gender-effects were found on any of the other VOEG items, nor on the averaged total VOEG score. No differences in gender were found on the mean score of the general health item either.

GENERAL CHARACTERISTICS

A MANOVA revealed overall differences between men and women on mean levels for age, working hours, type of insurance of patients, and number of hours spent on relaxing activities ($F(6,315)=14.15$, $p<0.001$). Subsequent univariate tests showed age, treatment hours and administrative hours to be significantly differing between men and women. It should be noted, however, that the large number of missing values on age could have influenced these results. It was found that about 1 in every 7 male dentists and 1 in every 5 female dentists did not provide this information. Being part of an omnibus test, these missing values influence the test as a whole and could be considered as the cause of the differences found. To control for this possibility, t-tests were used to reanalyze the differences, employing the 'exclude cases analysis by analysis' option in SPSS, and using an adjusted alpha level (Holland & DiPonzio Copenhaver, 1988). Table 3 shows the results of these analyses; again, only age, treatment hours and administrative hours differed significantly between men and women.

TABLE 3. DESCRIPTIVE CHARACTERISTICS OF MALE AND FEMALE DENTISTS: MEAN SCORES AND STANDARD DEVIATIONS

	Men			Women		
	N	Mean	SD	N	Mean	SD
Age (t(360)=5.49, p<0.001)	304	46.71	7.43	58	40.88	7.36
Treatment hours (t(424)= 8.08, p<0.001)	354	32.97	6.99	72	25.56	7.65
Administrative hours (t(420)= 3.31, p=0.001)	351	6.98	5.79	71	4.58	4.36
Percentage sick fund insured patients (t(412)= 1.33, n.s.)	344	56.13	14.47	70	53.47	18.54
Percentage privately insured patients (t(412)= -0.55, n.s)	344	43.86	14.42	70	44.96	18.72
Hours relaxation (t(401)= 1.80, n.s.)	337	6.85	5.95	66	5.41	5.99

In table 4 the results for the remaining general characteristics are shown. Chi-square analysis revealed the total number of patients treated per week to be different between men and women ($\chi^2(5)=58.15$, $p<0.001$). Inspection of standardized residual scores indicated that the proportion of dentists that treats up to 75 patients a week is higher among women than it is among men. In contrast, compared to the women a larger proportion of male dentists indicated to treat between 100 and 125 or even more patients a week. Using Chi-square, no differences in civil status or any of the other characteristics were found.

TABLE 4. DESCRIPTIVE CHARACTERISTICS OF MALE AND FEMALE DENTISTS FOR NR. OF PATIENTS (PER WEEK), CIVIL STATUS, AND OTHER VARIABLES

	Men		Women	
	N	%	N	%
Nr. of patients (per week)				
<20	5	1.4	5	7.0
20-50	23	6.6	14	19.7
50-75	49	14.2	25	35.2
75-100	81	23.4	19	26.8
100-125	81	23.4	6	8.5
>125	107	30.9	2	2.8
Total	346	100.0	71	100.0
Civil status				
Single	13	3.7	5	7.1
Married	332	94.6	64	91.4
Divorced	5	1.4	1	1.4
Widowed	1	0.3	0	0.0
Total	351	100.0	67	100.0
Other variables (dichotomous: percentage answering 'yes')				
Take time for relaxation	288	82.1	54	78.3
Membership of dentists' professional association	341	96.9	67	95.7
Post-graduate courses	336	95.2	64	91.4
Interest in vacancies elsewhere	33	9.4	11	15.7
Enhanced working conditions	238	68.4	38	55.1

UNDERLYING FACTORS FOR GENDER DIFFERENCES IN BURNOUT

In line with the second aim of this study, possible explanations for the difference in D were considered by examining the influence of secondary variables. The aforesaid gender differences in treatment hours, administrative hours, and age led to the selection of these variables for further examination. Analysis of gender differences on the D scale was repeated these variables as covariates. In including multiple variables in 1 overall analysis instead of using several specific analyses, the chance of making a

type-1 error (in which the null hypothesis is wrongfully accepted) is greatly reduced. Also, an assumption when using ANCOVA is the absence of an interaction effect between the covariate and the dependent variable (Stevens, 1996, p.322). This assumption was met: using age, practice and administrative hours as covariates, no such interaction effects were present. ANCOVA revealed no significant effects ($F(1,343)=0.80$, n.s.), indicating that when correcting for gender effects on age, practice and administrative hours, no gender difference exists on the D scale.

To strengthen the above findings, treatment hours, administrative hours and age were each categorized using 20% percentile ranks, after which mean D scores within each of the five ranks were compared between men and women. By taking the distribution of female dentists as a basis, within each rank an optimal number of women was ensured. Table 5 shows these categories, and the mean D scores for men and women within each category. Student's t-tests with corrected alpha levels indicated no differences between men and women on any of the categories, thus underscoring the findings reported above.

TABLE 5. MEAN DEPERSONALISATION SCORES AND STANDARD DEVIATIONS OF MALE AND FEMALE DENTISTS FOR AGE, TREATMENT HOURS (PER WEEK) AND ADMINISTRATIVE HOURS (PER WEEK)

	Men			Women		
	N	M	SD	N	M	SD
Age						
<35	14	1.37	0.49	12	1.13	0.55
35-38	27	1.01	0.64	11	0.96	0.70
39-42	53	1.36	0.78	12	0.90	0.50
43-46	53	1.20	0.82	12	1.23	0.83
47-58	152	1.20	0.82	11	0.82	0.45
Treatment hours (per week)						
<20	16	0.90	0.53	12	1.07	0.55
20-23	17	1.03	0.56	14	0.86	0.61
24-27	22	1.11	0.83	14	0.81	0.62
28-31	57	1.17	0.81	13	1.23	0.69
32-45	232	1.30	0.81	19	0.96	0.62
Administrative hours (per week)						
<2	33	1.02	0.53	15	0.93	0.67
2	26	1.02	1.00	11	1.09	0.84
3	20	1.09	0.75	7	0.80	0.43
4-7	131	1.35	0.78	24	1.02	0.60
8-23	129	1.24	0.82	14	1.00	0.57

Discussion

The first aim of the current study was to examine gender differences among Dutch dentists in burnout. Such a difference was found on the D scale of the UBOS-C; men showed significant higher scores on this scale than did women. A second aim of this study was to look for possible explanations for this result by exploring the gender differences on several work-related aspects. Significant differences in age (on the whole, women are younger), working hours (in both administrative and 'chair' hours, women work less) and number of patients (men treat more patients per week) were found. The main finding of the present study was that when controlling for age and working hours, the gender difference on the D scale disappeared. This result was found both when using a statistical method of analysis and when a more laborious, methodological method was employed.

On the whole, previous research has either focused on identifying gender-specific factors that directly influence the working conditions, or on the possible effect these factors have on other, less direct gender differences (e.g., burnout). To the best of our knowledge, the current study was unique in that both points of view were combined, particularly within the field of dentistry. The results can be considered supportive for the *structuralist* approach to the explanation of gender differences, as discussed by Cleveland *et al.* (2000, p.335). This approach suggests that the working situation itself is responsible for the level of work stress. Gender differences, in this view, are a reflection of different working conditions for men and women.

The gender differences on the number of working hours, age, and number of treated patients could be mediated by the unequal distribution in responsibility for household and childcare tasks (Hyde, 1991, p.187). In the traditional view that women are more attached to their families and marriages than men, it is to be expected that female dentists more often work on a part-time basis (resulting in less treatment hours and treated patients), or altogether stop working as a dentist (resulting in a lower mean age). Interestingly, in a study among Finnish dentists, Murtomaa, Haavio-Mannila and Kandolin (1990) reported an opposite trend for female dentists: unhappy marriages accounted highly for psychological fatigue among men, but not among women. Possibly, because dentistry is a 'high level' occupation, traditional patterns of gender

differences are less predominant (Mottaz, 1986). The absence of such 'typical' gender-differentiating factors can also explain the comparable levels of perceived stress among male and female dentists in the current study. Moreover, a type of self-selection within the group of female dentists could be at work here; perhaps the female dentist can be distinguished from women in other professions in terms of other, mediating factors (e.g., coping style, locus of control).

Regarding the higher score on D in male dentists, it seems obvious to attribute this finding to a higher number of working hours per week. However, current results do not preclude alternative explanations. For instance, it could also be that women reduce their working hours to adapt to adverse working conditions, like an increased workload or feelings of emotional exhaustion. Their reduced D scores can thus be seen as a (positive) outcome of an adaptive coping strategy. More research is needed, preferably in a longitudinal design to be able to go beyond the limitations of the current cross-sectional design.

Despite these reservations, also within dentistry the issue of gender should remain a focus within research on work-related stress and burnout. According to figures from the Dutch bureau of statistics (CBS), the proportion of women in the total working population increased from 32.7% in 1987 to 38.3% in 1997. Also, in this period the percentage of all women (age 15 and over) who are working increased from 34% in 1987 to 43% in 1997, while the proportion of men only increased by less than 2%. In line with these trends, the number of Dutch female dentists has also increased in recent years. Recent figures show that 20% of all Dutch dentists are female (De Putter & Den Dekker, 2002), and in 2020 the proportion women is expected to have risen to more than one-third of the total population of dentists (Stuurgroep toekomstscenario's tandheelkunde, 1993, p.79).

However intriguing and possibly important for future development of preventive programs, the main goal of this paper was not to address the issue of (the absence of) a more generic influence of gender on work stress, coping style or burnout. As Cherniss (1995, p.96) noted, the gender differences found could well have "less to do with chromosomes and more to do with differences in opportunities and support encountered in the workplace". In line with this thought, the results of the

current study emphasize the possibility that underlying aspects could directly influence gender differences in burnout. Such an understanding can have practical consequences, particularly for the interpretation of burnout scores. After all, in dictating norms to be used in future research, caution is warranted in choosing the factors that discriminate between these norms. The current results should encourage future research to take factors like working hours and age into consideration in examining gender differences in burnout.

CHAPTER 5

Burnout intervention among Dutch dentists: Long term effects[10]

Summary – The aim of the present study was to determine the long-term effects of a burnout-intervention program among Dutch dentists using a longitudinal design. Using the Maslach Burnout Inventory (Dutch version: MBI-NL), at the initial measurement in 1997 a 'burnout risk group' (N=171) was identified. This group received feedback on their scores and was invited to participate in an intervention program. Of the total group, 19 dentists participated in an intervention program. After the end of the intervention program, 92 dentists (the 19 participants and a control group) responded to a post-intervention survey in 1998. These dentists were approached once more one year later, and this time 78 dentists (84.8%) returned a questionnaire. While demonstrating an improvement on all subscales of the MBI-NL at the first posttest, results show that the program participants showed a relapse at the second posttest. Controls who took action on their own initiative, on the other hand, reported a beneficial effect in the long run. Finally, controls that did not take any preventive action showed little or no progress. Possible causes for these findings are discussed, including the influence of coping style, perceived control, confounding factors, demand characteristics, and the necessity of post-intervention follow-up.

The concept 'burnout' was first used in a scientific context in 1974 by Freudenberger (Freudenberger, 1974; Perlman & Hartman, 1982). Since then, burnout and work-related stress have received abundant scientific and social attention (Schaufeli & Enzmann, 1998). Generally, burnout is considered to be a response to chronic stress resulting from dealing with clients or patients, its core symptoms being a feeling of emotional exhaustion and the development of a negative, cynical attitude about the

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recipients of one's service or care (depersonalisation). A third component concerns the development of negative attitudes towards oneself in relation to the job (reduced personal accomplishment) (Maslach et al., 1996; Schaufeli & Van Dierendonck, 2000).

Burnout is a serious psychological condition, which can considerably affect both work and private lives of dentists. In a study conducted by Gorter *et al.* in 1997, it was found that 1 in every 5 active Dutch dentists was 'at risk' of burnout, with 1 in every 8 having 'high overall levels of burnout' (Gorter *et al.*, 1999c). The latter number is comparable to the risk group size found in a study among general practitioners in the south-east of England, namely 11% (Osborne & Croucher, 1994). In the Gorter study, the dentists' mean levels of burnout appeared to be favourable when compared to norm scores as provided by a recent edition of the burnout measurement manual (Schaufeli & Van Dierendonck, 2000) or to the scores obtained among comparable professions (see table 1).

TABLE 1. COMPARISON OF BURNOUT MEAN SCORES OF DUTCH DENTISTS, NORM AND OTHER PROFESSIONS[11]

	Dutch dentists[a]	Norm for general healthcare[b]	General practitioners[b]	Physiotherapists[c]
	N=687	N=10.552	N=562	N=442
EE	13.7 (8.6)	14.5 (8.0)	18.3 (7.0)	13.9 (8.7)
D	5.7 (3.8)	6.0 (4.0)	9.5 (3.7)	5.0 (3.6)
PA	30.8 (5.9)	29.5 (5.5)	26.7 (3.2)	32.6 (4.8)

[a](Gorter *et al.*, 1999c); [b](Schaufeli & Van Dierendonck, 2000); [c](De Vries & Hoogstraten, 1999)

However, those dentists with the highest burnout scores (>95th percentile) had extremely unfavourable scores when compared to norm scores (Schaufeli & Van Dierendonck, 2000). Moreover, in a review of the literature on burnout in dentists, Humphris (1998) suggests that burnout among dentists is likely to increase because of more demanding expectations of patients and higher standards in dental provision. Combined with the fact that in 1998, 1 in every 3 cases of incapacity for work among

[11] In tables 1, 2 and 3 of this chapter sum scores instead of mean scores are presented for the three burnout scales. Mean scores can be calculated by dividing the sum scores by the number of items contained in the scale. Thus, the mean burnout scores for Dutch dentists found by Gorter (1999c) were: 1.71 (EE – 8 items), 1.14 (D – 5 items), and 4.40 (PA – 7 items). See also chapter 9, *General discussion – 1. On burnout among Dutch dentists: levels and significance*, p. 109.

Dutch professionals was caused by psychological factors, of which a majority show a profile that closely matches the typical burned-out professional (Schaufeli & Enzmann, 1998), these data show that burnout among dentists deserves continued research.

Whereas empirical quantitative studies on burnout among dentists are relatively sparse, Gorter (2000) found an extensive amount of information on the specific demands of the dental work environment. He notes, however, that there is "…a great shortcoming in evidence-based knowledge on how to prevent the dentist from burning out." Recently, some longitudinal studies have been conducted (e.g., Bakker *et al.*, 2000b; Van Dierendonck, Schaufeli & Buunk, 1998), although these were not conducted among dentists. Moreover, most research in which attention was given to prevention or intervention suffered from methodological deficiencies, like a cross-sectional design, or the absence of a control group (Corcoran & Bryce, 1983; Schaufeli, 1995). To overcome these shortcomings, it is desirable to follow participants of a burnout intervention program, in order to assess their possible progress over a longer period of time, and compare these results with the scores of a control group of non-participants.

Earlier research on the effectiveness of burnout intervention programs suggests that emotional exhaustion can indeed be reduced (Corcoran & Bryce, 1983; Schaufeli, 1995; Van Dierendonck *et al.*, 1998), but most studies did not find any positive effects on the other burnout components (i.e., depersonalisation and personal accomplishment). It is therefore noteworthy that Gorter, Eijkman and Hoogstraten (2001) recently found positive effects on all three burnout components among dentists who had participated in a career counselling intervention program, whereas among two control groups, less or no positive effects were found. Because long-term effects are reported in literature, and Gorter *et al.* (2001) found effects on all three burnout components, it was to be expected that in the present study also this effect would have been stabilized or increased among the program participants. Therefore, it was hypothesized that, over a longer period, the positive effects within the intervention group would hold or even increase (hypothesis 1).

In the Gorter *et al.* study (2001) the control group was divided into those that took initiative to take preventive steps (self-initiative group) and those that did not. Although statistically significant on only two of the three factors of the Maslach Burnout Inventory – Dutch version (MBI-NL) (Maslach *et al.*, 1996; Schaufeli & Van Dierendonck, 1995, 2000), the self-initiative group also showed an improvement at the first follow-up. The fact that individuals of this group took action on their own accord could indicate an effective coping style, a personality trait that is considered to be crucial in dealing with stress, and the subsequent development of burnout (Perlman & Hartman, 1982; Schaufeli & Enzmann, 1998). Also, as Humphris (1998) points out, vulnerability to burnout is most likely linked to the perceived control of the work environment. This involves one's views about the ability to alter and modify the conditions in which one works; those who feel less in control are thought to be more susceptible to burnout (Glass & McKnight, 1996). It could be argued that the self-initiative group consisted of dentists who perceived their environment to be adaptable to their own needs. This is also indicated by the type of action this group undertook, which consisted mostly of very practical adjustments in everyday practice. The effectiveness of such adjustments could be augmented by the fact that dentists are confronted with them each and every working day. In line with these considerations, we expected the self-initiative group to also show improvement at a longer interval (hypothesis 2). Finally, we expected the control group, who undertook no action whatsoever, not to show any effect (hypothesis 3).

Material and methods

PARTICIPANTS AND PROCEDURE

In April 1998, Dutch dentists who had participated in a national survey the year before received personal feedback on their burnout score as measured by the MBI-NL. A 'burnout risk group' was identified, consisting of 184 dentists who scored unfavourably on all three subscales (emotional exhaustion – EE; depersonalisation – D; and personal accomplishment – PA) or on the two subscales that are generally considered to be central elements in the development of burnout (EE and D). Of this

group, 13 were excluded because they had indicated to prefer not participating anymore; the remaining 171 dentists received an invitation to participate in a burnout intervention program. A total of 19 dentists finally chose to participate in the program (Gorter et al., 2001).

Pre-test (T_0) data were available of all subjects from the national survey, as well as several socio-demographic and professional characteristics. The first post-test (T_1) data were gathered one month after the last group session of the program participants. Of the 19 program participants, who received a questionnaire by mail, 17 responded within six weeks (89%). Of those invited but not participating in the program, 103 dentists received a questionnaire; this group consisted of the original 171 dentists 'at risk' minus the 19 program participants. Also left out were the 40 dentists who were selected on their unfavourable scores on EE and D (since no one in this group had responded), and nine dentists who did not participate for a variety of reasons, or whose questionnaire appeared undeliverable. Within six weeks, 75 respondents responded.

In the current study, we presented all program participants with a questionnaire directly after attending a follow-up meeting one year following the intervention program (T_2). The controls were sent an identical questionnaire at their home or practice address in the same period. When there was no reaction within two weeks, the questionnaire was resent together with a reminder. This led to a total research group of 92 dentists, consisting of all 19 program participants and 73 controls (excluded were two non-participants whose questionnaires proved undeliverable).

MATERIAL AND DESIGN

The MBI-NL (Schaufeli & Van Dierendonck, 1995, 2000), consists of 20 items, which can be answered on a 7-point Likert scale, ranging from 0 ('never') to 6 ('every day'). Three subscale scores can be acquired – EE (8 items), DP (5 items) and PA (7 items). Examples of items from each subscale are: "I feel emotionally drained from my work" (EE); "I don't really care what happens to some patients" (D); and "I deal very effectively with the problems of my patients" (PA). Research has indicated the MBI-NL to be a suitable instrument for administration among dentists (Gorter et al.,

1999a). Besides the scores on the MBI-NL, socio-demographic characteristics (gender, age) and professional characteristics (organization of practice, working hours, number of patients) were also gathered at T_0.

Since no at random assignment to conditions took place, the design of this study is quasi-experimental, with a pre-test-post-test non-equivalent control group design (Judd, Smith & Kidder, 1991). The pretest data originate from the study that was conducted in 1997 (T_0). The first post-test took place one month after the last group session (T_1). Since non-participants could very well have undertaken preventive measures individually, this was checked in the T_1 questionnaire. Two groups of non-participants were thus created: one group indicating not to have taken any steps on their own initiative (control group), and another group that indicated to have taken the initiative for preventive steps themselves (self-initiative group). The contents of this 'self-induced' treatment consisted of changes such as making physical adjustments to the practice, hiring (a) new assistant(s), taking on new hobbies and more (regular) physical exercise. In figure 1 the groups and measures are summarized. In this design, O_1 to O_9 are the MBI-NL measurements within the three groups, X is the 'treatment' of the intervention program, and Y is the non-specified 'treatment' of the self-initiative group.

FIGURE 1. RESEARCH DESIGN

	T_0		T_1	T_2
Program participants	O_1	X	O_2	O_3
Self-initiative group	O_4	Y	O_5	O_6
No initiative group	O_7		O_8	O_9

T_0-T_2: chronological measurement points; O_1 - O_9: MBI-NL measurements; X: intervention; Y: self-induced intervention

INTERVENTION PROGRAM

The intervention program[12] consisted of individual and group meetings. As formulated by the agency, it was aimed at restoring "the balance by obtaining insight in one's own situation and working with a personal plan of action." The first intake sessions started in May / June 1998, and the program ended in November of the same year. Individual counselling sessions were held with career counsellors in June 1998, and these were followed by three group-based workshops in September, October and November. Each of these 24-hour workshops addressed a specific theme, and included an overnight stay.

The central theme of the first workshop was the development of a professional perspective: (re-)discovering personal talents and motivation, transference toward a new perspective and how to incorporate this perspective into personal and professional life. The second workshop focused on 'entrepreneurship with talents;' vision on one's own practice, leisure time, and personal development. The latter topic included dealing with dilemmas and obstacles, and how to make choices, set priorities and act effectively. 'Communication and action' was the central theme in the last workshop, which involved the balancing of personal and professional life, improving communication, dealing with conflicting interests, receiving support, and communication skills. Within each workshop, individual needs were stressed, and in between workshops individual counselling consults took place. By the end of the last workshop, each participant had prepared a personal plan of action.

STATISTICAL ANALYSIS

Differences between categorical variables measured at a nominal level were analysed using chi-square analyses. For ordinal variables, Kruskal-Wallis non-parametric tests for more than two independent samples were used.

Because of the low number of participants within each condition under investigation problems arose concerning the power of the statistical tests (i.e., the

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[12] The intervention program was conducted by the Van Ede consulting agency, Zeist, The Netherlands. A detailed description of the program can be found in Gorter (2000).

probability of rejecting the null hypothesis when it is false). One way to tackle this problem is to use one-tailed tests where justified (Hays, 1981; Stevens, 1996). In his discussion on the use of one-tailed tests, Shavelson (1981) indicated that if empirical evidence suggests a specific direction of an effect – which clearly was the case in the present analysis – a directional test is warranted.

For each of the burnout scales (EE, D and PA), paired t-tests were used to determine the significance of differences in mean MBI-NL score between T_0 and T_1, and between T_0 and T_2. These tests were repeated for each research group (intervention-, self-initiative, and control group). To control for type-I errors (i.e., the null hypothesis is rejected while it is true), an adjusted comparison wise alpha level was computed using the Hochberg modification of the Bonferroni procedure. This procedure is to be preferred over the Bonferroni or Bonferroni-Holm procedure, especially in cases where power is an issue (Kromrey & Dickinson, 1995).

An additional statistical approach is to examine the difference in the classification of scores using the norms as given in the manual of the MBI-NL (Schaufeli & Van Dierendonck, 1995). As a result, a categorization into five levels is formed, with burnout-scores ranging from very low to very high. A non-parametric analysis for more than two related variables (Friedman test) was used to assess whether the ranking in categories had changed at any of the three points in time (Hays, 1981). In addition, Wilcoxon analyses were used to determine the separate differences between T_0 and either T_1 or T_2.

For all statistical analyses a significance level of 0.05 was applied. Except where norm-classifications were compared, only data were included from respondents from which MBI-NL data on all three points in time were available. For this reason, we excluded 22 subjects with incomplete MBI-NL scores from the analyses.

Results

Response

Within the intervention group, 16 out of 19 questionnaires were returned (84.2%). Of the control group 62 out of 73 subjects responded (84.9%), making a total of 78

respondents (84.8%), consisting of 68 men and 10 women. Age varied between 27 and 59 years (M=43.8; SD=7.5). The group sizes are shown in table 2, which in addition includes a number of general (socio-demographic and professional) characteristics as well as mean T_0 levels for EE, D and PA, mean age, and mean number of working hours. Also included in table 2 are T_0 data for all non-respondents at T_1.

TABLE 2. COMPARISON OF T_0 SCORES OF THE INTERVENTION, SELF-INITIATIVE, CONTROL GROUP AND NON-RESPONDENTS

	Intervention	Self-Initiative	Controls	Non-response (at T_1)
N	19	37	36	92
Gender (%)				
Men	78.9	89.2	88.9	84.8
Women	21.1	10.8	11.1	15.2
Means (SD)				
EE	20.6 (6.4)	21.8 (7.4)	23.6 (9.1)	22.0 (7.4)
D	11.0 (3.8)	10.1 (3.1)	10.9 (3.9)	10.1 (3.7)
PA	26.4 (3.9)	25.0 (4.6)*	24.8 (4.3)*	29.7 (6.1)
Mean age (SD)	43.4 (7.0)	43.1 (8.2)	45.3 (6.8)	41.7 (7.9)
Mean chair hours (SD)	32.8 (8.9)	35.0 (5.7)	32.2 (8.8)	33.8 (5.9)
Mean administration hours (SD)	5.5 (3.8)	6.3 (3.6)	6.5 (5.2)	7.1 (5.7)
Organization of practice (%)				
Solo	63.2	50.0	52.8	59.8
Other	36.8	50.0	47.2	40.2
Number of patients (%)				
<1000	5.3	5.4	2.8	5.4
1000-2000	15.8	27.0	33.3	30.4
2000-3000	47.4	45.9	38.9	35.9
3000-4000	26.3	16.2	19.4	20.7
4000-5000	5.3	2.7	5.6	4.3
>5000	0.0	2.7	0.0	3.3
Ownership of practice(%)				
Total ownership	78.9	73.0	75.0	78.3
Partial ownership	21.1	24.3	22.2	12.0
No ownership	0.0	2.7	2.8	9.8

*significant difference with non-response group ($p<0.01$)

The distribution of men and women did not differ between the intervention, self-initiative, control group, or non-respondents. Differences between T_0 scores on the MBI-NL were found using MANOVA ($F=4.116$, $df=9$, $p<0.001$). Univariate analyses showed that only the PA scale differed significantly between groups ($F=11.458$, $df=3$, $p<0.001$). Post-hoc Tukey procedures indicated the self-initiative and control group to

have significant lower PA scores as compared to the non-respondents ($p<0.001$). No significant differences between groups were found for mean age or working hours. Finally, in table 2 results are given concerning a comparison between groups for organization of practice, number of patients, and ownership of practice. None of these differences attained statistical significance.

In sum, although the non-respondents showed a significantly higher level of PA as compared to both the self-initiative group and the control group, no apparent T_0 differences existed between the three groups under study.

TABLE 3. MEAN SCORES (STANDARD-DEVIATIONS) ON THE THREE BURNOUT-FACTORS (MBI-NL) ON THREE POINTS IN TIME

		Intervention	Self-initiative	Controls
		N=14	N=28	N=28
Emotional exhaustion (EE) range 0-48				
Pre-test	(T_0)	18.64 (4.09)	22.64 (7.78)	23.25 (9.04)
Post-test 1	(T_1)	16.36 (5.32)	18.18 (8.73) *	20.79 (9.18)
		t=2.40, p=0.032	t=3.29, p=0.003	t=1.590, p=0.124
Post-test 2	(T_2)	15.71 (7.56)	18.43 (7.87) *	18.93 (9.70)
		t=1.71, p=0.112	t=3.39, p=0.002	t=2.05, p=0.050
Depersonalisation (D) range 0-30				
Pre-test	(T_0)	10.43 (4.05)	10.04 (2.67)	11.07 (4.19)
Post-test 1	(T_1)	8.29 (3.20)	9.00 (4.88)	10.29 (5.09)
		t=1.55, p=0.146	t=1.03, p=0.312	t=0.979, p=0.336
Post-test 2	(T_2)	9.50 (3.21)	7.82 (2.96) *	10.43 (4.62)
		t=0.81, p=0.434	t=3.26, p=0.003	t=0.868, p=0.393
Personal accomplishment (PA) range 0-42				
Pre-test	(T_0)	26.79 (3.73)	25.32 (4.41)	24.46 (4.53)
Post-test 1	(T_1)	29.79 (3.79)	28.32 (3.84) *	25.75 (6.35)
		t=-2.82, p=0.014	t=-4.51, p<0.001	t=-1,381, p=0.179
Post-test 2	(T_2)	27.21 (5.25)	28.11 (4.48) *	25.93 (7.07)
		t=-0.286, p=0.779	t=-3.75, p=0.001	t=-1,256, p=0.220

* Significant differences ($p<0.05$, Bonferroni-Hochberg correction) between pre-test (T_0) and post-test (T_1 or T_2).

BURNOUT LEVELS: MEAN DIFFERENCES IN MBI-NL

Table 3 shows the mean scores for each dimension on the burnout-scale (EE, D, and PA) and for each group (intervention, self-initiative, and control group). Results are given for all three moments of measurement (T_0, T_1 and T_2). Within the intervention group the mean EE score on T_1 or T_2 did not differ significantly from the score on T_0, using the Bonferroni-Hochberg alpha correction procedure. On the D scale, both the T_1 and the T_2 scores did not differ significantly from T_0. Finally, on the PA scale the T_0-T_1 effect found by Gorter et al. (2001) was not confirmed. The T_2 score on this scale

showed a relapse, and did not show significant differences with T_0. Within the self-initiative group, T_2 showed a positive, statistically significant difference as compared to T_0; this was found for all three factors of the MBI-NL. The effects at T_1 on the EE and PA scales found by Gorter et al. (2001) were confirmed. The control-group, which took no action whatsoever, showed no change at any point in time on any of the burnout scales.

BURNOUT LEVELS: NORM COMPARISON

Table 4 shows the percentages of respondents whose score fall in the five categories as given in the manual of the MBI-NL, for each point in time. With regard to EE, Friedman analysis showed no changes within the intervention group. However, the self-initiative group did change between moments in time (χ^2=9.97, df=2, p<0.008). It appeared that more dentists fell into a high/very high category at T_0 than at T_1 (Wilcoxon test: Z=-2.42, p=0.016) or at T_2 (Z=-2.14, p=0.033). Surprisingly, within the control group a positive shift in EE was also found (χ^2=8.12, df=2, p=0.017), but

TABLE 4. PERCENTAGES WITHIN THE THREE GROUPS FOR EACH OF THE MBI-NL NORM CATEGORIES

	Score range	Intervention group			Self-initiative group			Control group		
EE		T_0	T_1	T_2	T_0	T_1	T_2	T_0	T_1	T_2
		N=19	N=16	N=16	N=37	N=35	N=31	N=36	N=31	N=31
Very low	<4	0	0	0	0	0	0	0	0	3
Low	4-9	0	6	19	0	14	7	0	7	13
Moderate	10-20	58	75	44	57	54	65	50	48	45
High	21-28	32	19	31	24	20	16	22	29	29
Very high	>28	11	0	6	19	11	13	28	16	10
D		T_0	T_1	T_2	T_0	T_1	T_2	T_0	T_1	T_2
		N=19	N=16	N=16	N=37	N=36	N=32	N=36	N=31	N=31
Very low	0	0	0	0	0	0	0	0	0	0
Low	1-3	0	6	0	0	8	13	0	7	3
Moderate	4-10	53	75	69	60	78	72	53	48	52
High	11-14	21	13	13	30	3	16	28	32	26
Very high	>14	26	6	19	11	11	0	19	13	19
PA		T_0	T_1	T_2	T_0	T_1	T_2	T_0	T_1	T_2
		N=19	N=16	N=16	N=37	N=35	N=32	N=36	N=31	N=31
Very low	<19	0	0	0	11	0	0	6	19	19
Low	19-24	32	19	44	24	17	19	36	19	23
Moderate	25-30	53	44	31	60	54	38	50	39	32
High	31-35	16	38	13	5	29	41	8	19	19
Very high	>35	0	0	13	0	0	3	0	3	7

only the shift from T_0 to T_2 proved to be significant ($Z=-2.50$, $p=0.012$).

For the self-initiative group, the changes in D and PA scales from high/very high to lower categories were significant ($\chi2=13.00$, $df=2$, $p<0.002$, $\chi2=17.51$, $df=2$, $p<0.001$, respectively). Wilcoxon analyses showed significant differences between T_0 and both posttests, for both D ($Z=-2.23$, $p=0.026$ and $Z=-3.12$, $p<0.005$, respectively) and PA ($Z=-3.39$, $p<0.002$ and $Z=-3.75$, $p<0.001$, respectively). Neither the intervention group nor the control group showed changes on these scales.

Discussion

The current research examined the long-term effects of a burnout-intervention program for dentists. The main hypothesis was that participants of an intervention program would benefit over a longer period of time. This hypothesis could not be confirmed. Although Gorter et al. (2001) did find positive results on all burnout scales when tested directly after the end of the program, these effects seemed to have disappeared one year later; none of the mean scores on the three dimensions of the MBI-NL differed significantly when compared to the pre-intervention scores. Likewise, no changes in percentages between norm categories were found in the intervention group. In contrast, the scores of a group not participating in the program, but taking preventive action on their own initiative, showed an improvement when compared to the pre-intervention scores, both when considering the mean MBI-NL scores and norm-percentages. This confirms the second hypothesis. Finally, we hypothesized that a control group would show no effect whatsoever. Tests of mean scores supported this hypothesis, but analysis of shifts among norm categories did indicate an effect for emotional exhaustion on T_2. These results will be discussed in more detail below.

The effects Gorter *et al.* (2001) found at T_1 for the intervention group did not hold at T_2. This applied to all three dimensions of the MBI-NL. Whereas other intervention evaluations (Corcoran & Bryce, 1983; Schaufeli, 1995; Van Dierendonck *et al.*, 1998) found positive effects on emotional exhaustion, we found no such effects in the current study; the effect at T_1 did not meet the criteria dictated by the

Bonferroni-Hochberg correction procedure. There are a number of possible explanations for these findings.

First, the current study used a one year period between first and second posttest, whereas the majority of studies to date used a much shorter time span. As Van Dierendonck, Schaufeli and Buunk (2001) noted in their research on the causal order between the three burnout dimensions, the period between points of measurement could be an "all-important factor." They assumed it is likely that different processes may be at work in the short term and the long term. A similar issue could be in effect here.

Secondly, the large standard deviation of the scores at T_2 indicates that, whereas the group as a whole seemed to improve on emotional exhaustion, the respondents *within* the group differed too much to justify any conclusions about an overall effect. A similar effect was found in this group by Gorter *et al.* (2001), albeit in the depersonalisation scale; it was concluded that the program gave room for contradictory effects.

The content of the intervention program itself could be a third possible explanation for the lack of effect within the intervention group. The problems that were addressed in the workshops mainly focus on career development. It could well be that the group that participated in the program was not ready to address these issues. Research on burnout has clearly identified correlates such as health problems, depression, neuroticism and psychosomatic symptoms (Schaufeli & Enzmann, 1998). Someone who struggles with depressive feelings and emotions may not be able to appropriately internalize the suggestions handed to him or her by the program. In such a case, the intervention may still have an immediate effect by giving some relief for a perceived dead-end situation. However, in the long run it is to be expected that this effect will diminish because a more invasive problem (i.e., depression, health concerns) has not been dealt with adequately. In essence, this can only be overcome by an even more 'tailor-made' intervention than was the case in the current program.

Furthermore, participants made a large investment; they not only invested in time and money, but also on an emotional level. This, in turn, can lead to an effect that has been described to be a result of the 'demand characteristics' of a situation (Eagly

& Chaiken, 1993). Such an effect implies an awareness of the expected outcome of the program and the intention to comply with this outcome (Hoogstraten, 2004). When making an investment (in time and money) like participating in an intervention program, one is probably expecting some outcome, regardless of whether this outcome is objectively present. In combination with a raised awareness of the kind of problem one has, as well as the sort of steps that should be taken to prevent these problems from (re)occurring, these issues will have a much greater influence directly after a program than at a later assessment.

Lastly, an issue that should be taken into account in explaining the results in the intervention group is the quasi-experimental design of the study. Although no differences were found for a number of factors we investigated, a self-selection effect can not be ruled out. As discussed above, underlying factors such as depression were not assessed, but could have a confounding effect on the long-term effects. This effect would not equally be present, relevant, or invasive for all participants, which would explain the large deviation in effects we found. Therefore, we think that we should stress the importance of an approach in which personal characteristics and problems are taken into account in determining the intervention type most suitable for this individual. Another important issue is to provide for (more) follow-up meetings. This corresponds with the finding that most participants indicated a need for this kind of meetings. As a matter of fact, the participants organized such a meeting on their own initiative, although this meeting took place only one year after the end of the program.

Within the group that took steps on their own initiative, the results found by Gorter *et al.* (2001) were confirmed; on all scales of the MBI-NL an improvement at T_2 as compared to T_0 was found. Several underlying factors can be at work here; although no differences were found between research groups on socio-demographic and professional variables, other factors that have not been assessed could have had a distinct influence. A general explanation is that the self-initiative group had a different, more intrinsic motivation for change. After all, dentists in this group took action not because some external source told them to (as was the case with the intervention group). Instead, after first contemplating about the possible causes for the negative scores they received, this group reached their own conclusions about what

type of action would be most appropriate. As mentioned in the introduction, this indicates the presence of an effective coping style, which could have a large inhibiting effect on the development of burnout (Perlman & Hartman, 1982; Schaufeli & Enzmann, 1998).

The fact that dentists in this group undertook action on their own initiative could also indicate a heightened perceived control of the work environment. As Humphris (1998) pointed out, vulnerability to burnout is most likely linked to this factor. Although one can think that dentists-general practitioner have substantial control over their everyday activities, there are situations in which a dentist feels he or she is not in control of various possible courses of action. Certainly in the Netherlands, where a shortage in dentists is an acknowledged problem, the increasing patient load can easily lead to such situations. As such, it could be argued that the self-initiative group consists of dentists who perceived their environment to be adaptable to their own needs.

The controls, who reported not to have made any changes in response to their feedback, did not show any progress in mean MBI-NL scores at T_1 or T_2. However, analysis of shifts in percentages did indicate an improvement on emotional exhaustion on T_2. A possible explanation is that some dentists within the control group also took action after the first post-test, and could be regarded as a 'second self-initiative group'. Secondary analysis of the data indeed indicated that of the 28 controls at T_2, only 10 specifically indicated to have taken no steps whatsoever. Based on our results within the self-initiative group, this subgroup can also be expected to make a positive shift, thereby positively influencing the control group as a whole.

Finally, we found that the non-respondents had significant higher levels of personal accomplishment as compared to both the self-initiative group and the control group, whereas there were no differences in exhaustion or depersonalisation. Although any conclusions about the rationale behind this finding remain tentative, the higher levels of personal accomplishment could point at an overestimation of one's capabilities, and an underestimation of the problems one is facing. As a result, one is not inclined to seek or accept any help from the outside.

In conclusion, the results of this study supported two out of three hypotheses. Participation in an intervention program does seem to have beneficial effects. However, these effects are only noticeable in the short term and seem to diminish in time. Dentists who showed the initiative to undertake steps on their own accord seemed to benefit in the long run. The evidence examined does also suggest that knowledge of one's level of burnout in itself may induce a positive shift in the long run.

Although limitations of this study – group sizes and the quasi-experimental design – have been recognized, we think these results should receive attention; they indicate a need for clear feedback among dentists on the issue of burnout and stress. Burnout is seen as a gradual process (Perlman & Hartman, 1982; Schaufeli & Enzmann, 1998), which could easily lead to a variety of problems before a person notices something is wrong. This could apply even more so to dentists, given the confined, often solitary working conditions, in which feedback is sparsely available. Therefore, it seems that a large group of dentists can benefit from such information, possibly in the form of self-checklists. For instance, by using modern communication technology, excellent accessibility and direct feedback can be provided for. Future research should focus on the effects of such on-line checklists.

Another group of dentists – like those in the intervention group – seems to be in need of more personal counselling. The current research and comments from program participants suggests that more follow-ups and perhaps an even more individualistic approach is needed for this group. In addition, the relatively low number of dentists that actually agreed to participate could indicate uneasiness to participate in the program. This may be due to the fact that the program was partly group-based, which also advocates an individually oriented program. Alternatively, a reluctance to participate could also be caused by the emphasis on the psychological aspects in the program description. Perhaps this reluctance is reduced by placing more emphasis on practice circumstances, and by explicitly outlining the specific type of problems that are dealt with.

Finally, a remaining group of dentists did not do anything in response to their feedback on burnout scores. Not surprisingly, they showed the least change on the

burnout scales. It is this group that is hardest to reach for prevention and intervention. From a preventive view, the question how to reach this group should become a focus for future research.

CHAPTER 6

Dentists' self assessment of burnout: An Internet feedback tool[13] [14]

Summary – The Stress Thermometer is an easily accessible Internet-based instrument for feedback on work stress and burnout. The aim of this paper is to describe the development of this instrument and to determine its applicability within the dental practice. The Stress Thermometer was made accessible to all members of the Dutch Dental Association, of which 77% of all Dutch dentists are members. Frequency of use was determined, and descriptive data was collected. During an evaluation period of five months at least 12% of all possible respondents made use of the Stress Thermometer. Descriptive characteristics of the response group, as well as levels of burnout and work stress, corresponded with those found in the Dutch dentist population. However, some deviations were also present. Results indicate the applicability of the Stress Thermometer to a representative variety of dentists. Although the deviations found should not be ignored in future use, the Stress Thermometer was successful in reaching a population that is difficult to reach. It effectively calls attention to sensitive personal issues concerning work-related stress and burnout.

Burnout is considered a long-term process of chronic work related stress (Maslach et al., 1996; Maslach & Leiter, 1997; Schaufeli & Enzmann, 1998; Schaufeli & Van Dierendonck, 2000). Within dentistry, burnout is considered a possible cause of the increasing number of dentists that leave the profession prematurely, and can even be assumed to have an adverse effect on patient care (Gorter, 2000; Humphris, 1998). Prevention and intervention should therefore remain a major concern in research on burnout in general, and in dentistry in particular. It is acknowledged that raising

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awareness of work related stress is a first element in this process (Schaufeli & Enzmann, 1998), and early recognition is considered crucial in the prevention of drop-out (Maslach & Leiter, 1997; Schaufeli & Enzmann, 1998). Moreover, within dentistry it was shown that the sheer confrontation with personal feedback on a burnout measure has beneficial effects in the long run (Te Brake et al., 2001).

According to the Dutch Dental Association (NMT), in The Netherlands the predominant mode of practice is solo (71% of all practicing dentists), which is in accordance with figures reported elsewhere (College voor Zorgverzekeringen, 2001). This means that dentists often work in isolated conditions, with no direct supervision. As a result, within the practice early warning signs, such as fatigue, a heightened irritability towards patients, or other expressions of grievance, are not easily detected. Even for dentists with regular professional contacts (e.g., by attending seminars or congresses), it is reasonable to assume work-related stress and burnout are not discussed without difficulty as they often transcend the working environment and extend to the private (household) situation. Therefore, there seems to be a necessity for alternative ways in providing feedback on this subject matter.

In an effort to deal with these considerations, the 'Stress Thermometer' was developed. The objective of the Stress Thermometer was to use the Internet to provide direct individual feedback to dentists-general practitioner. By using the world wide web as a delivery medium, anonymity can be provided, thereby lowering the threshold for use (Stanton, 1998). Because the instrument is computer based, dynamic and interactive forms of feedback are possible. Based on the response of the dentist on established questionnaires for burnout and work-related stress, scores can be calculated directly, together with further explanation about their meaning and possible consequences. Thus, the Stress Thermometer can be considered a commonsensical way of reaching a hard to reach population with feedback concerning personal and therefore sensitive information. To our knowledge, within dentistry such a set up is unique.

The current study aims to describe the development of the Stress Thermometer, and to determine its applicability. Accordingly, the Stress Thermometer was made available to a large population of dentists, and its frequency of use was measured.

Furthermore, if so approved by the respondent, burnout and work-stress scores were gathered, and demographic and work-related aspects were assessed via an (optional) extra questionnaire. By comparing these data with population data, possible deviating characteristics of respondents can be determined. Finally, the respondent was given the possibility to convey more general questions and/or comments about the instrument. Thus, the applicability of the Stress Thermometer was assessed both numerically as well as qualitatively.

Material and methods

Overview

The Stress Thermometer was developed in cooperation with the NMT, which hosts an Internet site for its members (the 'TandartsenNet'). Within this context the Stress Thermometer was presented. On the main page of TandartsenNet an announcement of the Stress Thermometer remained visible during the complete period of evaluation. Initially, to improve awareness among practicing dentists, an announcement was placed in a two-weekly magazine that is distributed among all NMT-members. In addition, together with the start of the evaluation, the magazine published a more extensive article about the Stress Thermometer, including an interview with the developer. Evaluation started at the moment the Stress Thermometer went online (June 6, 2002) and continued until December 31, 2002. It was decided by the NMT to remove the Stress Thermometer from their Internet site after this date (e.g., to allow for a first assessment, but also for reasons of copyright associated with the use of the MBI-NL).

Stress Thermometer

The Stress Thermometer consists of two parts. In the first part, the level of burnout was assessed. The internationally most widely used instrument to measure burnout is the Maslach Burnout Inventory (MBI), developed by Maslach and Jackson(Maslach et al., 1996). It has been shown elsewhere (Gorter et al., 1999a) that the Dutch version of this instrument (the MBI-NL) shows satisfactory results when used among a

population of dentists. The MBI-NL consists of 20 items that form three subscales – emotional exhaustion (EE – 8 items), depersonalisation (D – 5 items) and personal accomplishment (PA – 7 items). High levels of EE and D, combined with low levels of PA, are considered indicative for burnout. The second part of the Stress Thermometer was more specifically aimed at stressors within the dental setting by evaluating the pressure experienced from 23 work characteristics. Of these items, 21 originate from the Dentists' Experienced Work Stress Scale (DEWSS) (Gorter, Albrecht, Hoogstraten & Eijkman, 1999b). Six subscales can be distinguished: work pressure (2 items), financial aspects (5 items), patient contacts (3 items), work contents (4 items), career perspective (5 items), and professional and private life (2 items). Because in Dutch dentistry the issue of task-delegation is becoming an increasingly important topic of discussion, two additional items were included to measure a seventh subscale: team aspects. The respondent was asked to state the amount of pressure he or she experiences from a given work characteristic on a 5-point Likert scale, ranging from 1 'no pressure' to 5 'very strong pressure.' Following the 23 items, one last item was added concerning the gender of the respondent. Feedback was also presented in two sections. In both parts, the respondent's score was evaluated using reference scores. Norm scores for both the MBI-NL and the DEWSS were derived from a survey conducted in 2001 among a representative group of Dutch dentists (for a detailed description of this study, see chapter 2).

Feedback

The first part of the feedback summarized the results of the MBI-NL. A distinction was made between high, normal or low scores per subscale (EE, D and PA), based on percentile ranges from the norm scores (low: 0-25%; normal: 25-75%, high: 75-100%). Following the recommendations in a recent publication of the MBI-NL manual (Schaufeli & Van Dierendonck, 2000), gender was taken into account in evaluating the D score. A subscale score was labelled favourable (i.e., low to average scores on EE and D; average to high scores on PA) or unfavourable (i.e., high scores on EE and D; low scores on PA). The combination of the three subscales, each scoring either favourable or unfavourable, resulted in eight possible outcomes. To distinguish

between these outcomes, the decision rule dictated by Schaufeli and Van Dierendonck (2000) was used: an unfavourable score on EE, combined with an unfavourable score on D and/or an unfavourable score on PA indicates a high risk on burnout. Because some consensus exists on the relative importance of the EE and D scale, the cases in which these scales proved unfavourable were also considered to be of some risk. All possible combinations of subscales and their corresponding outcomes are shown in table 1; 6 of the eight outcomes were labelled either 'high risk' or 'some risk', the remaining two were labelled 'no direct risk' (low EE, D and PA) and 'no risk' (low EE and D, high PA). The dentist was shown a feedback text that corresponded to the outcome. In box 1 an example is given of the text corresponding to the 'high risk' outcome. This text included an approximate description of the outcome of the three separate subscales, but it focused on the primary outcome (e.g., favourable or unfavourable), and its accompanying recommendation (e.g., high risk – no risk). If so desired, it was made possible for the dentist to access the exact results on EE, D and PA, including an additional clarification of these results.

TABLE 1. COMBINATION OF SUBSCALES AND RESULTING OUTCOME

	EE	D	PA	Outcome
1	+	+	+	High risk for burnout, recommending further help
2	+	+	-	"
3	+	-	+	"
4	+	-	-	Some risk for burnout, indication for concern
5	-	+	+	"
6	-	+	-	"
7	-	-	+	No direct risk for burnout, unfavourable PA score
8	-	-	-	No risk for burnout

Note: '+' indicates an unfavourable subscale score; '-' indicates a favourable score.

BOX 1. FEEDBACK TEXT CORRESPONDING TO A 'HIGH-RISK' OUTCOME

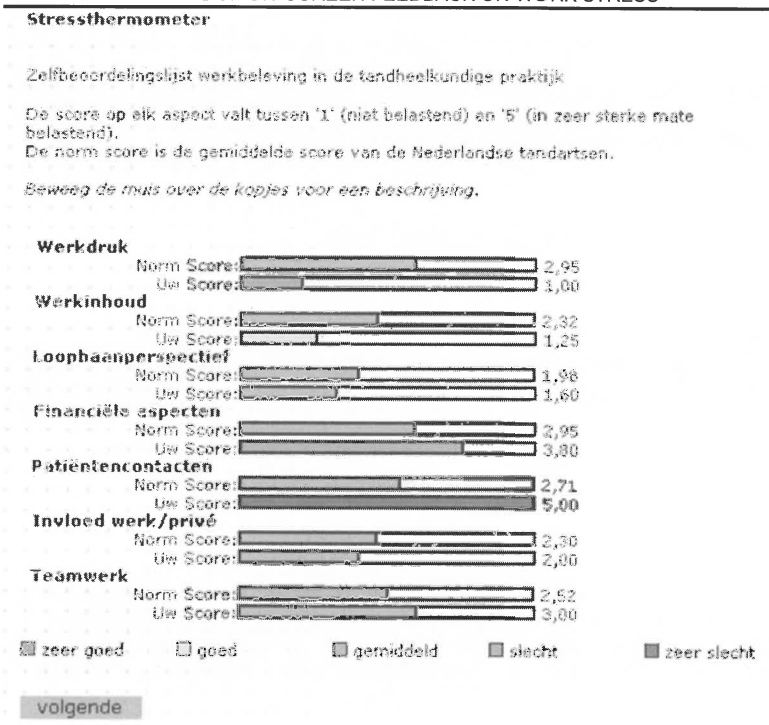
Based on the combination of your scores on the three subscales we believe there is **considerable reason for concern**. You indicated to be highly exhausted by your work, to increasingly detach yourself from your patients, and to have reduced feelings of competence about the dental work. We recommend to seriously consider the ways in which you experience your work, and how the dental profession *is working you.*

We again would like to stress that this conclusion is based on your own answers. You should realize that this is a fairly arbitrary indication, which could be highly influenced by temporary factors.

Do you yourself sometimes have the idea that your work becomes too dominating? If so, we recommend you talk to someone who is specialized in the treatment of work-related stress. You can do this without any obligations. The possibility of referral is further addressed at the end of the Stress Thermometer.

The second part of the feedback summarized the respondent's score on each of the seven DEWSS scales in relation to the norm scores. For each subscale, a first bar graphically showed norm score in an orange colour, while a second bar represented the respondents' personal score. The colour of the latter depended on the range, limited by percentile scores of the norm, in which the respondent's score fell. Five different colours were possible: dark green (very low: 0-5%); light green (low: 5-25%); orange (average: 25-75%); purple (high: 75-95%) and dark red (very high: 95-100%). See figure 1 for an on-screen example of the work stress feedback. Also included was a short explanation of each subscale (which was shown when the respondent placed the mouse cursor over any of the seven DEWSS scale headings).

FIGURE 1. EXAMPLE OF ON-SCREEN FEEDBACK ON WORK STRESS



Language is Dutch. The top text refers to the page title followed by a short explanation of the range of scores. Results on all seven DEWSS work stress scales are shown: werkdruk=work pressure; werkinhoud=work contents; loopbaanperspectief=career perspective; financiële aspecten=financial aspects; patiëntencontacten=patient contacts; invloed werk/prive=work-home interference; teamwerk=team work. For each scale, norm score and personal ('Uw') scores are shown both graphically and numerically.

ADDITIONAL DATA

Following the feedback, the respondent was asked 1) to give permission to use the provided data for research purposes, and 2) to fill in an extra questionnaire concerning demographic information. These demographics included: gender, current practice setup, practice organization, region of practice, number of working hours, interest in post academic education, interest in changing the working environment, and other working activities. It must be noted that whether or not respondents agreed to make their data available for analysis, the results remained anonymous in that they could not be traced to a specific person. Finally, at the very end of the Stress Thermometer the possibility was provided to comment on the instrument.

To determine the frequency of use (and thereby answering our main objective) a 'hit-counter' was installed within the Stress Thermometer. The completion the Stress Thermometer caused this counter to raise with one count. After the subsections consisting of the MBI and DEWSS items, as well as the question on the respondents' gender were completed, the computer 'flags' the login-number with which the dentist has to log in. This 'flag' prevents the dentist from completing the Stress Thermometer a second time thereby preventing possible double counts.

STATISTICAL ANALYSIS

Non-parametric demographic results were compared to population figures using chi-square analysis. Where appropriate, Bonferroni-Hochberg correction was used to control for type-I errors (Holland & DiPonzio Copenhaver, 1988). To determine the reliability of the MBI-NL and the DEWSS as used in the context of the Internet, Cronbach's alpha's and interscale correlations for the subscales were compared to those founding the above-mentioned 2001-study. Mean scores on number of working hours (practice -, and administrative hours), burnout (EE, D and PA), and work stress (7 scales) were analyzed using multivariate analysis of variance for overall effects. When a significant overall effect was found, subsequent univariate tests were used to isolate differences.

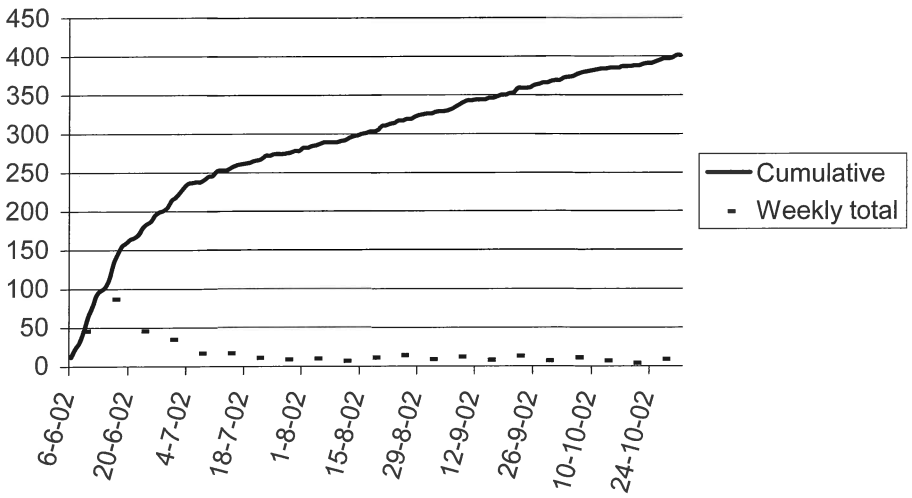
Results

RESPONSE

During the first months of the evaluation period an increasing number of respondents indicated their wish to be able access the Stress Thermometer more than once. Subsequently, it was decided to include this option during November and December, 2002, during which period respondents were no longer 'flagged' as individual hits, as explained above. Consequently, the frequency of use of the Stress Thermometer after this date (which would most probably contain double counts) was not included in this evaluation. Results from the hit-counter indicated that 708 dentists completed the Stress Thermometer during the five-month period between June 6 and October 31, 2002. There are two ways to give this number a context. Firstly, the response figures can be contrasted against the size of the complete research population. Figures from the NMT indicate that 77% of the Dutch dentist population (as of January 1st, 2003 consisting of 7623 dentists) has a NMT membership. It follows that a maximum of 5900 dentists had access to TandartsenNet – an overestimation, given the fact that not everyone of these dentists had access to Internet. Using these figures, our results represent at least 12% of all possible respondents. A second way to evaluate the response is to relate it to the 'normal use' of TandartsenNet. Although no exact numbers could be provided on its use, the NMT estimated that approximately 1000 dentists visit TandartsenNet on a monthly basis. Given the monthly average of about 140 respondents to the Stress Thermometer, a response figure of 12% does seem correct (or even somewhat conservative).

Of the 708 unique respondents, 390 (55%) agreed to make available their personal score. The response pattern of this group is displayed in more detail in figure 2. The effect of the media attention that accompanied the start of the Stress Thermometer is clearly visible in the steep response curve in the first weeks (on average, during the first month 8-9 dentists responded each day). Response rate declined in the following weeks, which will obviously be related to the fact that the Stress Thermometer could only be filled out once. Nevertheless, even months after the initial announcement the Stress Thermometer did not cease to draw attention (on average, during the last month

FIGURE 2. RESPONSE PATTERN DURING THE EVALUATION PERIOD OF THE STRESS THERMOMETER



one dentist responded each day). Finally, comments received from respondents were very positive (e.g., "Fun!", "I can recommend it to anyone", "Time well spent", "Informative"), often indicating an increased insight in one's own situation (e.g., "It's good to make these otherwise vague feelings more concrete", "Confirms my own feelings and gives cause to make some changes"). As noted above, a large number of respondents mentioned that they would very much like to be able to use the Stress Thermometer more than once.

DESCRIPTIVE CHARACTERISTICS

On average, respondents needed 17 min (SD=6) to complete the Stress Thermometer (including the reading of feedback). Descriptive characteristics were compared to both the 2001-study mentioned above and to NMT-figures (where available). In relation to the 2001-study more male than female dentists filled out the Stress Thermometer ($\chi^2(1)=14.87$, $p<0.001$). However, in relation to the NMT-figures no such differences were found. Respondents indicated a higher interest in vacancies or a different working environment ($\chi^2(1)= 22.56$, $p<0.001$). Differences were also found in practice organization; compared to the 2001 results, more Stress Thermometer respondents

worked in combined practice with colleagues ($\chi^2(1)= 10.36$, $p<0.002$). None of the other descriptive characteristics deviated from the 2001-study or the NMT-figures. Table 2 shows the mean number of working hours. Respondents of the Stress Thermometer reported both a higher number of treatment hours and administrative hours.

BURNOUT SCORES

Reliabilities of the three MBI-NL subscales, as indicated by Cronbach's alpha, was 0.90, 0.72 and 0.70 for EE, D and PA respectively. These figures correspond to those found in the 2001-study and those mentioned in the MBI-NL manual (respectively, 0.90, 0.70, 0.83, and 0.87, 0.66, 0.79). In table 2 the mean scores and standard deviations for EE, D and PA are shown for the Stress Thermometer respondents and from the 2001-study. Multivariate analysis of variance indicated an overall significant difference between the scores in both studies. Subsequent univariate analyses showed the D scale to show significant differences: Stress Thermometer respondents showed a higher score ($F(1)=20.81$, $p<0.001$). In line with recommendations in the MBI-NL manual (Schaufeli & Van Dierendonck, 2000), the D scale was further examined, distinguishing between male and female dentists (see table 3). In the current sample,

TABLE 2. MEAN NUMBER WORKING HOURS, BURNOUT SCORE, AND WORK STRESS SCORE (STANDARD DEVIATION) FOR THE STRESS THERMOMETER AND THE 2001-STUDY

	Stress Thermometer			Study 2001			Test of significance
	N	M	(SD)	N	M	(SD)	(multivariate/univariate)
Working hours (per week)							F(2)=12.59, p<0.001
Treatment hours	369	32.4	(7.0)	492	31.0	(8.8)	F(1)=6.44, p<0.025
Administrative hours	369	6.6	(4.8)	492	5.1	(4.6)	F(1)=22.37, p<0.001
Burnout (range 0-6)							F(3)=14.79, p<0.001
EE	390	1.88	(1,14)	486	1.75	(1.09)	F(1)=2.85, n.s.
D (male)	335	1.53	(0,90)	366	1.34	(0.84)	F(1)=8.76, p<0.004
D (female)	55	1.39	(0,99)	119	0.96	(0.64)	F(1)=11.33, p<0.002
PA	390	4.55	(0,82)	486	4.42	(0.85)	F(1)=4.99, p=0.026
Work stress (range 1-5)							F(7)=19.24, p<0.001
Work pressure	390	2.74	(0.99)	495	2.95	(0.98)	F(1)=9.24, p<0.003
Work contents	390	2.23	(0.75)	495	2.32	(0.76)	F(1)=3.02, n.s.
Career perspective	390	1.98	(0.92)	495	1.98	(0.91)	F(1)=0.00, n.s.
Financial Aspects	390	2.35	(0.92)	495	2.96	(1.01)	F(1)=84.01, p<0.001
Patient contacts	390	2.54	(0.98)	495	2.71	(1.11)	F(1)=5.32, p<0.025
Private-Work	390	2,39	(1.01)	495	2.30	(1.02)	F(1)=1.82, n.s.
Team aspects	390	2,49	(0.97)	495	2.52	(0.94)	F(1)=0.13, n.s.

however, no differences were found on the D scale between men and women; compared to the 2001-results, both male and female respondents had significant higher (and therefore unfavourable) D scores. A difference was also found between the studies on the PA scale. Interestingly, here also Stress Thermometer respondents showed higher (and therefore more favourable) scores in comparison to the population. No differences were found on the EE scale.

In table 3 the distribution of dentists among the eight possible outcomes is shown (see also table 1). Chi-square analysis indicated significant differences between the Stress Thermometer data and the results from the 2001 study ($\chi^2(7)= 31.72$, $p<0.001$). Inspection of the percentages showed deviating scores for the feedback types 6 and 7; a disproportional large number of Stress Thermometer respondents were classified in category 6 ('some risk for burnout') whereas the opposite was true for category 7 ('no direct risk for burnout'). For the remaining categories, very similar proportions were found in both samples (e.g., the total proportion of Stress Thermometer respondents falling into 'high risk' categories 1 trough 3 was 21.0%, versus 18.9% in the 2001 study).

TABLE 3. PERCENTAGES: OUTCOMES FOR THE STRESS THERMOMETER AND THE 2001 STUDY

	EE	D	PA	Stress Thermometer (N=390) %	2001 study (N=486) %
1	+	+	+	8.7	8.2
2	+	+	-	10.5	8.0
3	+	-	+	1.8	2.7
4	+	-	-	9.2	8.2
5	-	+	+	2.1	3.1
6	-	+	-	13.8	5.6
7	-	-	+	3.6	9.7
8	-	-	-	50.3	54.5

WORK STRESS

Reliabilities of the seven DEWSS subscales varied between 0.66 (Team aspects) and 0.89 (Career perspective). These figures correspond to those found in the 2001 study (maximum deviation is 0.05). Table 2 includes the results on work-related stress. Although absolute differences between the seven subscales were small, an overall multivariate analysis revealed significant differences: respondents to the Stress

Thermometer indicated lower experienced stress from work pressure, financial aspects, and patient contacts.

Discussion

The Stress Thermometer was successful in delivering feedback about work-related stress and burnout to dentists-general practitioner. More than 12% of all possible respondents were reached within five months, during which period the evaluation comments from respondents were overwhelmingly positive, and even months after the initial introduction dentists were still using the Stress Thermometer. Furthermore, on a large number of aspects the respondents were similar to the Dutch dentist population. This result is all the more remarkable given the notion that Internet access is not universal (Bakker, Demerouti & Schaufeli, 2002; Gellersen & Schmidt, 2002; Stanton, 1998; Stanton & Rogelberg, 2001) and that demographic characteristics of Internet users tend to deviate from those of the general population (Best, Krueger, Hubbard & Smith, 2001; Netherlands Statistics, 2002; Stanton, 1998). The ability of the Stress Thermometer to draw a wide range of dentists can be explained by the relatively high Internet access within The Netherlands (Netherlands Statistics, 2002; Nielsen//Netratings, 2003). In addition, one can expect dentists to have good access to the Internet given their overall high education and income level, characteristics which are typically associated with Internet survey respondents (Best et al., 2001; Netherlands Statistics, 2002).

A number of deviations from reference scores were also found. Stress Thermometer respondents more often than was expected cooperated with colleagues in their practice organization. Perceivably, within a cooperation of dentists the 'news' of the existence of the Stress Thermometer might increase the possibility that more than one of them will 'have a try'. It is more difficult to explain why respondents indicated a relatively high interest in vacancies or other working surroundings and spent more hours working in the practice. Concerning the more central aspects that were measured, burnout and dental-specific work stress, the results were inconclusive. On both depersonalisation (D) and personal accomplishment (PA) respondents showed higher scores, while the level of emotional exhaustion (EE) did not deviate

from the Dutch dentist population (i.e., EE scores were 'normal'). These results were atypical in that higher scores on D usually coincide with higher scores on EE and *lower* scores on PA. It therefore seems unwarranted to conclude that respondents had higher burnout levels. Moreover, the absolute differences on D and PA were small, and no difference was found on EE, which is considered the most central aspect of burnout (Schaufeli, Maslach & Marek, 1993). Finally, the inference that the response group had higher burnout levels is also contradicted by the finding that experienced work stress corresponded with, or was *lower* than population figures.

An alternative explanation for these deviating results relates to the Internet as the medium to present questionnaires. An obvious difference between the Stress Thermometer and a 'normal' pencil-and-paper presentation of the MBI-NL and DEWSS is the element of direct feedback. It is speculated (Schmidt, 1997) that if respondents know that the feedback they receive is about themselves and based on the data they provide, they are likely to supply accurate and thoughtful responses. Similarly, Baron and Siepman (1999) reported that in web-based research, the number of nonsensical answers dramatically decreased (as compared to pencil-and-paper surveys). Assuming that Stress Thermometer respondents indeed answered more accurate, this could explain the ambiguous results. Although deviations were small, and did not appear to have any tendency as regards content, the results are possibly an indication of an artefact of Internet-based surveys that should certainly be taken into account in future research.

Considering future developments, possible enhancements should also be mentioned. Firstly, as mentioned before, respondents were able to respond only once. Although in the current setup this was necessary to accurately determine the number of respondents, the integration of the possibility to respond more than once would clearly increase the value of the instrument as a personal 'monitor' of work stress and burnout. Moreover, respondents themselves indicated their wish to use the Stress Thermometer periodically. Secondly, although results were gathered on both burnout and work stress, feedback on the level of risk of a respondent was solely based on the respondent's MBI-NL score. Although the respondent is urged to take both sources of information into account in making personal inferences, they are presented separately

and no direct link is made. By incorporating known relationships between burnout and these work-related aspects (Gorter *et al.*, 1998), more nuance and accuracy can be given to the feedback. Thirdly, because the anonymity of the respondent had to be guaranteed, a follow-up measurement was precluded. In earlier research (Te Brake *et al.*, 2001), it was found that dentists' burnout level improved following the confrontation with feedback. A follow up research could help to replicate and substantiate these results. Hopefully, in future developments these issues (which technically undoubtedly are surmountable) can be addressed.

In addition to the evident success of the Stress Thermometer, there are a number of reasons to further investigate the Internet as a means to perform research and give feedback. The essential aspect of the Stress Thermometer, providing the feedback, is greatly simplified by its complete automation. Together with the anonymity of the respondent, the relative simplicity of operation can lower the threshold to actually use the instrument, in comparison to a pencil-and-paper version. Another formidable advantage of presenting a feedback instrument via the Internet is that costs in terms of both time and money are reduced (Musch & Reips, 1999). Once the instrument is developed and made presentable, distribution no longer is relevant and the collection of data (if so desired) can be fully automated.

In conclusion, it should be stressed that the evaluation of the Stress Thermometer was not meant to provide results on work stress and burnout that are representative for the dentist population. The objective of this article is to communicate the development of an Internet-based instrument, and to determine its applicability. Although a number of possible adjustments have been summed up that could certainly enhance the practical applicability of the instrument, on the whole this study has delivered a clear indication of the usability of the Internet for delivering personalized feedback to a rather introvert (and chiefly solistic) occupational group like dentists. Additionally, the Stress Thermometer can be distinguished from existing web-based feedback instruments (e.g., Docpotter'sPathfinding_Books_&_Useful_ Information, 2003; Prohealth_Online, 2003), not only because validated questionnaires are used, but also by taking specific dental stressors into account, thereby providing tailor-made content. Finally, as Schaufeli and Enzmann (1998) note,

"forewarned is forearmed" (p.144). Considering the preventive effects of insight into the pitfalls of work related stress and burnout (Te Brake *et al.*, 2001), the Stress Thermometer provides for a modern and accessible means to put this notion into (the dentists') practice.

CHAPTER 7

Job engagement and burnout among Dutch dentists[15]

Summary – The aim of this study was to examine (the measurement of) burnout and engagement among dentists. A sample of 497 Dutch dentists-general practitioner was included (survey response rate of 59%), consisting of 372 men and 121 women. Results of a confirmative factor analysis confirm the hypothesised three-factor structure of engagement (vigor, dedication and absorption) as measured by the Utrecht Work Engagement Scale (UWES). It was also found that engagement was related negatively to burnout as measured by the Maslach Burnout Inventory (MBI). However, a model that consists of a reduced ('core') burnout factor and an enhanced engagement factor (consisting of the three theoretically proposed factors plus the MBI-subscale personal accomplishment) showed the best fit. Although these findings were somewhat contradictory with theoretical presumptions, the results were similar to those found in earlier studies. Overall, the outcomes of this study indicate the applicability of an engagement questionnaire to measure job engagement among dentists.

Within dentistry, chronic work stress and its possible consequence, burnout, are recognized as potential hazards for both the professional as well as the personal lives of dentists (e.g., Rada & Johnson-Leong, 2004). A recent development within burnout research is the shift from the traditional concept and scope to its opposite: job engagement (Schaufeli & Bakker, 2003b, 2004; Schaufeli et al., 2002a; Schaufeli et al., 2002b). This development reflects an emerging trend towards a 'positive psychology' that focuses on human strengths and optimal functioning rather than on weaknesses and malfunctioning (Seligman & Csikszentmihalyi, 2000). In trying to

[15] This chapter is submitted for publication.

reinforce these strengths and by striving to promote optimal functioning, it is hoped that work stress and burnout can be prevented.

In an early definition, Maslach and Leiter (1997) defined job engagement as the opposite of burnout. In their view, burnout (as measured using the Maslach Burnout Inventory or MBI) is the negative pole of a continuum, with engagement representing the positive antipode. From this one-dimensional view, it would follow engagement is indicated by a combination of low levels of emotional exhaustion (EE) and depersonalisation (D), and high levels of personal accomplishment (PA). In positioning burnout and engagement as the endpoints of one and the same dimension, the assumption is made that the two opposites are complementary. However, someone who is not burned out cannot automatically be considered engaged (or vice-versa), while it is also not unlikely that some level of engagement and burnout can co-exist. As noted by Schaufeli and Bakker (2004), the (MBI-) measurement of burnout is based on frequency scores. Therefore, for someone who indicates experiencing a negative state 'once a week,' can easily have feelings of exurban joy in the next. Furthermore, besides such practical considerations, the one-dimensional view also does not hold given the debate on the polarity of positive and negative affect (Diener, 1999). It was shown that positive and negative states can be co-existent *and* be negatively correlated, thus it could be argued that burnout and engagement also are independent, albeit negatively related constructs (Schaufeli & Bakker, 2004).

To tackle these issues, Schaufeli and Bakker (2003b) developed the Utrecht Work Engagement Scale (UWES), which aims to measure the concept of engagement as a dimension that is separated from, but opposed to, burnout. Analogous to burnout, within engagement three scales are differentiated: vigor, dedication, and absorption. Vigor (VI) is characterized by high levels of energy and mental resilience while working, and the willingness and ability to invest effort in one's work. dedication (DED) is characterized by a sense of significance, enthusiasm, inspiration, pride, and challenge. Schaufeli and Bakker (2004) specifically name VI and DED as being the opposites of the EE and D, respectively, spanning two dimensions labelled activation (EE-VI) and identification (D-DED). A final scale that is distinguished in engagement is absorption (AB), which is characterized by being fully concentrated and happily

engrossed in one's work, whereby time passes quickly and one feels carried away by one's job (Schaufeli *et al.*, 2002b). Existing research on the UWES reports high intercorrelations between the subscales, and high internal consistency (Cronbach's alpha) for the total scale. Although this is indicative for a one-dimensional construct, confirmative factor analysis indicated that the (theoretically proposed) three-dimensional construct better fits the data (Schaufeli & Bakker, 2003b).

Because of their antipodal conceptualization, the empirical relation between burnout and engagement is of interest. Research in which both the MBI and the UWES were administered indicates a medium to strong negative relation between the burnout subscales EE and D and the engagement subscales VI and DED. Interestingly, the highest correlation is found between all three UWES subscales and PA. Moreover, support was found for a model that includes a 'core' burnout factor consisting of EE and D, and an extended engagement factor in which PA is incorporated with VI, DED and AB (Schaufeli *et al.*, 2002b). Thus, there is empirical reason to believe that PA fits better to the more positive, engagement side, than to its origins of burnout.

A first aim of this paper is to study the levels of burnout and engagement within dentistry and as such can be considered an extension of earlier research on the use of the MBI among dentists (Gorter *et al.*, 1999a). Second, the relation of this new construct to burnout is examined. The preliminary norms reported by Schaufeli and Bakker (2003b) were established using a database of diverse samples that range from production workers to top-level managers. Although physicians as well as entrepreneurs are included in the database (albeit to a relatively small extent), the dental occupation is unique in that it mainly consists of entrepreneurs *within* health care. Because of its relatively exceptional place within health care, the dental occupation is of particular interest in extending the validity of the UWES questionnaire.

To examine the new construct of engagement within dentistry, psychometric features (internal consistencies, interscale correlations and factorial validity) of the UWES will be examined. In view of earlier findings (Schaufeli & Bakker, 2003b) it is expected that the scales will be highly related, but that a three-factor structure will find more support than a one-factor structure. Secondly, the relation between burnout

and engagement is investigated. Specifically, the VI-EE and D-DED relations are expected to be high and because they are defined as opposites, these correlations are also expected to be negative. The relation between the MBI and UWES is further examined using Structural Equation Modelling (SEM). Consistent with the results found by Schaufeli and Bakker (2002b), it is hypothesized that a model that considers the higher-order structure of the six burnout and engagement dimensions (i.e., EE, D and PA load on 'burnout', whereas VI, DED and AB load on 'engagement') is preferred to a model that assumes one, undifferentiating, underlying structure. Finally, an alternative model is included that distinguishes between a 'core' burnout factor (EE and D) and an expanded engagement factor (PA, VI, DED, and AB).

Material and methods

Participants and procedure

A group of 848 randomly selected Dutch dentists took part. To attain comparability with the Dutch general population of dentists the sample was stratified for gender, age and region. Each participant was sent an extensive questionnaire in which a number of different topics were covered. Following the recommendations by Dillman (1978), the survey included an announcement, two reminders and (when necessary) the complete resending of the questionnaire.

Material

A Dutch translation of the Maslach Burnout Inventory (Maslach et al., 1996; Schaufeli & Van Dierendonck, 1995) was used to measure burnout. With the publication of a new manual (Schaufeli & Van Dierendonck, 2000), the Dutch version of the MBI was renamed Utrechtse Burnout Schaal (UBOS). The 20 items of the UBOS can be answered on a 7-point Likert-scale, ranging from 0 ('never) to 6 ('every day'). Three subscale scores can be acquired; EE (8 items), D (5 items) and PA (7 items). Engagement was measured using the 15-item version of the UWES (Schaufeli & Bakker, 2003b). As with the UBOS, scores for each item ranged from 0 ('never) to 6

('every day'), and three subscale scores were computed (VI, DED and AB), each consisting of 5 items.

STATISTICAL ANALYSIS

Internal consistency of the three UWES subscales was assessed using Cronbach's alpha and interscale correlations were assessed by Pearson's correlations. Mean scores and standard deviations were computed and compared to norm scores using multiple analyses of variance (MANOVA). On a more explorative basis, each subscale was correlated with age, and gender differences in mean score were examined.

To assess the dimensionality of the UWES, three confirmatory factor analytic models were analyzed using the LISREL 8.50 program (Jöreskog & Sörbom, 1996; 2001). Two models where compared to a null model, in which all item scores are uncorrelated. In the first model the 15 items of the UWES load on a single 'engagement' scale. The second model tests the proposed three-factor structure of engagement. To investigate the relation between burnout and engagement, three additional models were compared (M_1 – M_3). The first model (M_1) was a one-factor model in which the subscales of both UBOS and UWES load on one common factor. In the second model (M_2) EE, D and PA load on a common 'burnout' factor, and VI, D and AB on an 'engagement' factor. The third model (M_3) in which EE and D load on a common 'burnout' factor, and PA, VI, DED and PA load on the 'engagement' factor.

The goodness-of-fit of the models was determined using absolute and relative fit indices. Absolute fit indices were the chi-square goodness-of-fit index (χ^2) with the accompanying degrees of freedom and the Root Mean Square Error of Approximation (RMSEA). Relative fit indices are the Non-Normed Fit Index (NNFI), also called the Tucker Lewis Index (TLI), and the Comparative Fit Index (CFI). In contrast to the absolute indices, relative indices are independent of sample size and are therefore to be preferred (Bentler, 1990). Furthermore, the NNFI is comparably more robust for sample size than both the RMSEA and the CFI (Marsh *et al.*, 1988). The fit of a model is good when the values of the NNFI and the CFI approach 1; a higher value represents a better fit. For these indices most studies consider a value of 0.90 or higher

as indicative of a good fit. For the RMSEA, values smaller than 0.06 imply an acceptable fit (Hu & Bentler, 1999).

Results

Response

A group of 497 dentists-general practitioner returned a usable questionnaire (58.6%), consisting of 372 men and 121 women (the gender of four dentists remained unknown). Mean age of this group was 44.6 years (SD=9.0). Regrettably, these relatively low response rates are in line with a trend within dental research that is noticed over the last decade of dropping response rates. This 'survey fatigue' could also have influenced the current study. On the other hand, the total questionnaire that was sent contained more than the questionnaires used in the current study, consisting of 161 items. Dillman (1978) found that in surveys using item numbers in excess of 125 items, response rates typically decline to an average of 65%. Seen in this light, the current response rate is acceptable. Concerning the representativeness of this sample, the distribution of several descriptive characteristics (gender, civil status, age, working hours, nr. of patients, region of practice) did not differ from the characteristics found a representative sample taken in 2000. Given these considerations, it is safe to assume that the current sample adequately represents the Dutch dental population.

Psychometric results

Internal consistencies of the UBOS subscales were highly satisfactory (Cronbach's alpha: EE: 0.90; D: 0.70; PA: 0.83), and interscale correlations were comparable to norm scores (EE-D: 0.59; EE-PA: -0.36; D-PA: -0.44). The three UWES subscales also all had high internal consistencies (VI: 0.84, DED: 0.90, and AB: 0.82), that showed minimal deviation from the figures presented in the UWES manual (Schaufeli & Bakker, 2003b). For each scale, all items contributed to the internal consistency. Cronbach's alpha for the UWES as a whole was very high (alpha=0.94), but consistent with the alpha of 0.92 reported in the manual. Interscale correlations were 0.77 (VI-DED), 0.80 (VI-AB), and 0.82 (DED-AB). Again, these results are very

similar to results reported in the UWES manual. Table 1 shows the intercorrelations between the UBOS and UWES subscales. Apparently, within dentistry, engagement has a remarkably high (negative) relation with EE. Furthermore, results did not reflect the predicted VI-EE and D-DED contrasts. On the other hand, the strong correlation of personal accomplishment with engagement concurs with results found among other professions.

LEVEL OF BURNOUT AND ENGAGEMENT

The upper half of table 2 shows the mean scores for burnout, as well as the norm scores reported in the UBOS manual. As recommended in the UBOS manual, the scores on D are presented separately for men and women. Differences between dentists' results and the figures reported in the manual were small, although the lower score found on D for women and the higher score on PA was statistically significant (respectively, $t(118)=-3.01$, $p=0.003$, and $t(486)=5.27$, $p<0.001$). The lower half of

TABLE 1. CORRELATIONS BETWEEN THE UBOS SUBSCALES (EE, D, AND PA), AND THE UWES SUBSCALES (VI, DED, AND AB), FOR THE CURRENT STUDY AND AS REPORTED IN THE UWES MANUAL (N=9.679)

	Study 2001			UWES provisional manual (2003)		
	VI	DED	AB	VI	DED	AB
EE	-0.55	-0.46	-0.38	-0.38	-0.26	-0.15
D	-0.44	-0.50	-0.38	-0.50	-0.66	-0.46
PA	0.63	0.69	0.58	0.66	0.67	0.50

All correlations are significant at $\alpha=0.01$

TABLE 2. MEAN SCORES AND STANDARD DEVIATIONS ON THE BURNOUT AND ENGAGEMENT SUBSCALES FOR DENTISTS COMPARED TO NORM SCORES (SCHAUFELI & BAKKER, 2003B; SCHAUFELI & VAN DIERENDONCK, 2000)

Burnout	Dentists 2001 (N=487)		UBOS Manual (N=10552)	
	M	SD	M	SD
EE	1.75	1.07	1.81	1.00
D men	1.34	0.84	1.27	0.84
D women	1.00*	0.68	1.14	0.78
PA	4.42*	0.84	4.22	0.78
Engagement	**Dentists 2001 (N=491)**		**UWES Manual (N=9679)**	
	M	SD	M	SD
VI	3.95	1.13	3.99	1.10
DED	4.32*	1.09	3.91	1.31
AB	3.86*	1.09	3.58	1.18

* Significantly different from norm scores.

table 2 shows the mean scores on the three engagement subscales. On both DED and AB dentists had a significantly higher score compared to the norms from the UWES manual (respectively, $t(490)=8.28$, $p<0.001$, and $t(490)=5.63$, $p<0.001$), although, in an absolute sense, these differences were small.

Significant correlations of the three subscales with age were found, although the correlations in itself were very low (ranging between –0.11 for AB and –0.14 for VI). Interestingly, these correlations were negative, indicating a loss of engagement with age, while the UWES manual reports positive correlations (ranging between 0.05 for VI and 0.17 for AB). Gender differences were only found on the UBOS D scale, which concurs with results found elsewhere (e.g., Schaufeli & Van Dierendonck, 2000; Te Brake *et al.*, 2003). Differences between men and women were not found on any of the UWES scales. Again, these results differ from the findings described in the UWES manual, in which men are reported to score significantly higher on DED and AB than women (although these differences were small).

STRUCTURAL CONFIRMATIVE ANALYSIS

Table 3 shows the results from the confirmatory factor analyses. The lower chi-square ratio and RMSEA, and the higher NNFI and CFI values indicate a better fit for the three-factor model compared to the one-factor model. Moreover, only the three-factor model shows an acceptable value for the CFI index. These findings are similar to the results reported by Schaufeli and Bakker (2003b), although compared to the figures of the UWES manual, the fit is slightly worse.

TABLE 3. STRUCTURAL FIT OF ONE-FACTOR AND THREE-FACTOR SOLUTIONS OF THE UWES

Model	χ^2	df	RMSEA	NNFI	CFI
Dentists 2001					
Null model	4990.91	105	0.53	0.0	0.0
1-factor model	622.11	90	0.12	0.87	0.89
3-factor model	518.80	87	0.11	0.89	0.91
UWES manual					
1-factor model	10937.76	90	0.11	0.87	0.89
3-factor model	7789.57	87	0.10	0.90	0.92

Note: χ^2: Chi-square goodness-of-fit index, df: degrees of freedom, RMSEA: Root Mean Square Error of Approximation, NNFI: Non-Normed Fit Index, CFI: Comparative Fit Index.

In table 4 the results are shown of the different combinations of the burnout and engagement concepts. Model M_1, in which all subscales load on one general factor, clearly shows the least fit. The chi-square value and fit indices indicate the best fit of M_3, in which only EE and D load on the burnout factor, while PA and the three UWES subscales all load on the engagement factor. Compared to the results found by Schaufeli, Salanova *et al.* (2002b, also included in table 4), these results are only slightly deviating, although the current findings indicate an even better fit of M_3. Standardized correlations between burnout and engagement are –0.88 for M_2, and –0.66 for M_3. This means that burnout and engagement share a common variance of 77% and 44% for M_2 and M_3 respectively. With regard to M_3, the results correspond to those reported by Schaufeli, Salanova *et al.* (2002b); they found, in a diverse sample of employees, a correlation between burnout and engagement of –0.62 (representing a common variance of 38%).

TABLE 4. MEASURING THE FIT OF DIFFERENT MODELS UTILIZING THE UBOS AND UWES SUBSCALES

Model	χ^2	df	RMSEA	NNFI	CFI
Dentists (Current study, 2001)					
M_1	206.06	9	0.20	0.84	0.90
M_2	178.53	8	0.20	0.85	0.92
M_3	96.15	8	0.15	0.92	0.96
(Schaufeli *et al.*, 2002b)					
M_1	451.64	18	0.16	0.72	0.83
M_2	402.70	16	0.16	0.72	0.85
M_3	216.29	18	0.11	0.87	0.92

Note: χ^2: Chi-square goodness-of-fit index, df: degrees of freedom, RMSEA: Root Mean Square Error of Approximation, NNFI: Non-Normed Fit Index, CFI: Comparative Fit Index. M_1: all six subscales load on one common factor; M_2: EE, D and PA load on the factor 'burnout'; VI, DED and AB load on the factor 'engagement'; M_3: EE and D load on the 'burnout' factor, PA, VI, DED, and AB load on the 'engagement' factor.

Discussion

The first aim of this study was to investigate the levels of burnout and engagement among dentists. The absolute level of EE among dentists did not differ from the norm within general health care, while female dentists even show a significant lower level of depersonalisation, and all dentists indicate higher feelings of personal

accomplishment. These results are consistent with earlier findings, in which dentists were found to have lower burnout levels, especially in comparison with general physicians (Gorter et al., 1999c). Also, this study further replicates the psychometric properties of the Dutch version of the MBI (or UBOS) by re-establishing the invariance of its three-factor structure when used among dentists. Furthermore, compared to the (preliminary) norm scores, dentists are more dedicated, and more absorbed in their work, although these levels seem to decrease with age (which is in contrast to results found elsewhere). Thus, on the whole, Dutch dentists seem somewhat less burned out, and somewhat more engaged in daily work when compared to the norm.

A second aim was to examine the relation of burnout and engagement. As was expected, among dentists the concepts of burnout and job engagement proved to be negatively correlated. A high, negative correlation (approaching –1.00) can be interpreted as a sign that the two concepts are indeed opposites. However, as stated in the introduction, part of the rationale behind the UWES was to develop a new and distinguishable operationalization of engagement. A high negative correlation is disqualifying for the discriminating nature of such an instrument. The correlation found among dentists was –0.88 within the originally proposed model, while it was –0.66 for the model in which burnout consists of its 'core' components (EE and D) and engagement is extended with PA. In line with the above, a preference should thus be given to the latter model, which is also in concurrence with the overall better fit of this model. Therefore, the results confirm that burnout and engagement are negatively correlated and to a certain extent share variance. Although the common variance (44%) is somewhat higher than reported by Schaufeli, more than half of the variance is unique, underscoring the usefulness of a distinct concept of 'engagement'.

Interestingly, an alternative model, in which PA is grouped with VI, DED and AB in an engagement factor, and EE and D in a burnout factor, had a better fit to the data than a theoretically proposed model of engagement and burnout. Thus, PA loads on the 'wrong' factor. Two main reasons for this result can be proposed. First, it is possible that the positive phrasing of the PA items – which coincides with the phrasing of the engagement items, but is inconsistent with the negative phrasing of EE

and D – is of influence. The results of Bouman, Te Brake and Hoogstraten (2002)[16] give some support for this notion, although more research is needed with regard to this issue. For instance, it would be interesting to see how a revised MBI, in which the PA scale is rephrased (i.e., negatively phrased PA items, in correspondence to the phrasing of the other MBI scales), would compare to the UWES. Alternatively, these results could also be indicative of the awkward position of this scale within the concept of burnout. Whereas D is supposed to be a consequence of EE (a notion that is supported by the high correlations between these scales that are typically found), PA was found to have a somewhat independent role (e.g., Lee & Ashforth, 1996; Maslach *et al.*, 2001). Leiter (1993) found evidence for the independent development of PA, and also within dentistry it was found that PA developed relatively autonomously (Gorter *et al.*, 1999a).

No clear support was found for the assumption that EE and D would correlate particularly high with VI and DED, respectively. These opposites would form two dimensions that can be called *activation* (EE-VI) and *identification* (D-DED) (Schaufeli & Bakker, 2004). Although the negative relation between EE and VI was somewhat higher than the D-VI relationship, the D-DED correlation hardly deviated from the EE-DED correlation. This latter result also contrasts with the particularly strong D-DED relationship reported in the UWES manual. Highest correlations were found between PA and all UWES subscales. This is in concurrence both to the UWES manual figures, as well as to the finding that a model of engagement that includes the PA subscale best fits the data.

Concerning the psychometric properties of the UWES, a high comparability was found with psychometric figures reported elsewhere, indicating that it is warranted to use the UWES among dentists-general practitioner. Evidence was found for a one-factor solution (given the very high value of Cronbach's alpha), as well as for the notion that the UWES consists of three distinct aspects (given the preference found in model comparison). However, although the three-dimensional model leads us in the right direction, more work is needed to understand why even that model does

[16] This study is described in more detail in chapter 9 (3. On distinguishing burnout from related terms), p.112.

not provide a particularly good fit to the data. Nevertheless, the use of the three subscales can provide additional information. For instance, it was found that burnout and engagement have different correlates; 'engaged' and 'burned out' people differ in taking initiative in the face of adversity (coping style), generating positive feedback and the level of 'fit' between organizational and personal goals (Schaufeli & Bakker, 2003a). Just as burnout research has shown that the three subscales differ in their antecedents and consequences (Lee & Ashforth, 1996), the three engagement subscales can further enhance theory and, in time, practical implication of the engagement construct.

In conclusion, the relation of engagement with burnout seems to somewhat contradict theoretical assumptions. Again, the divergent role of the PA scale was demonstrated. Specifically, the finding that PA 'belongs' to engagement, and not to burnout, merits a closer examination of its place within the concepts of burnout and engagement. Future research should consider whether the item phrasing can be held responsible for this result, or if PA is tied to engagement on a more conceptual level. Nevertheless, the results indicate that engagement is a conceptually valuable and distinct addition to the body of research on work experience. Psychometric characteristics of the UWES questionnaire as administered among a dental population show only slight deviations from the norms (in which entrepreneur-like occupations are somewhat underrepresented). However, it is important to extend the scope of research among a wide variety of occupations and cultures, to further establish the validity of the UWES questionnaire. By introducing the concept of job engagement, a positive extension is given to research in this field of research. The shift in focus from the negative to the positive side of work experience hopefully inspires future research to closer examine the important correlates of the engagement scales.

CHAPTER 8

Job resources in Dutch dental practice[17]

Summary – The aim of this study was to develop an instrument measuring job resources among dentists, and to assess the relative importance of these resources. Additionally, job resources will be related to job satisfaction. 848 Dutch dentists-general practitioner received a questionnaire in order to monitor work experiences, including the Dentists' Experienced Job Resources Scale (DEJRS, 46 items, score range: 1 (not satisfying) to 5 (very satisfying), and the Dentist Job Satisfaction Scale (DJSS, 5 items, Cronbach's alpha = 0.85). A total of 497 (58.6%) dentists responded. Factor analysis (PCA) on the DEJRS resulted in eight factors (Cronbach's alpha: $0.75 > \alpha < 0.89$), representing distinguishable categories of job resources. In rank order: Immediate Results / Aesthetics (M=4.04, SD=0.5); (Long term) Patient Results (M=4.03, SD=0.6); Patient Care (M=3.90, SD=0.6); Craftsmanship (M=3.77, SD=0.7); Idealism / Pride (M=3.65, SD= 0.6); Entrepreneurship (M=3.55, SD=0.9); Material Benefits (M=3.05, SD=0.7); and Professional Contacts (M=3.03, SD=0.7). Subscale correlations with the total DEJRS are: $0.57 > r < 0.88$. All subscales show a positive correlation with the DJSS. The DEJRS is a valuable and psychometrically sound instrument to monitor job resources as experienced by dentists-general practitioner. Dentists report immediate results and aesthetics, and long term results of working with patients to be the most rewarding aspects. All job resources showed a positive correlation with job satisfaction. It is discussed that stimulating a greater awareness of job resources serves a major role in burnout prevention.

Working in a dental practice is recognized to be both a physically and mentally demanding profession. Consequently, occupational stress among dentists has regularly been the topic of research in the last two or three decades (Blinkhorn, 1992; Cooper, Mallinger & Kahn, 1978; Freeman, Main & Burke, 1995; Gorter et al., 1999b;

[17] This chapter is submitted for publication.

Howard, Cunningham, Rechnitzer & Goode, 1976; Humphris, 1998; O'Shea, Corah & Ayer, 1984). Summarizing these empirical studies, the following categories of job related stress factors among dentists emerge: Work Pressure, Financial Aspects, Patient Contacts, Work Contents, Career Aspects, Team Aspects, and Work and Private Life Interference (Gorter et al., 1999b). Apparently, dentistry is a profession with a wide range of possible pitfalls.

There are several theoretical approaches to work stress, each using a different definition. One of the models frequently used in relation to work stress comes from the interaction theory. This theory states that the evaluation of the work situation by an individual as being threatening and the assessment as to whether or not the individual knows how to deal with the threat is crucial for stress to occur (Lazarus, 1995). One of the possible consequences of chronic occupational stress for the individual is professional burnout (Freudenberger, 1974). The most commonly used definition of professional burnout consists of three dimensions: mental or emotional exhaustion, the development of a negative or cynical attitude towards one's patients or clients, and the tendency to evaluate oneself negatively (Maslach *et al.*, 1996).

In organizational psychology, the path to burnout is sometimes described as one in which the professional increasingly experiences a lack of resources. For instance, in the Conservation of Resources theory, the basic tenet is that people have a deeply routed motivation to obtain, retain, and protect that which they value (Hobfoll & Freedy, 1993). According to other authors, job resources should be seen as the opposite of job demands, which are responsible for exhausting someone (Leiter, 1993). Resources function as a buffering protection against burnout, and burnout occurs when a net loss of valuable personal buffers, or resources, is perceived that cannot be replenished.

Burnout thus can be considered a serious risk to the dental profession, causing both a threat to the available work force and a personal tragedy for the individual dentist. Therefore, prevention and intervention of burnout deserves continuous attention. Indeed, burnout has been the topic of studies among Dutch dentists-general practitioner recently (Gorter, 2000; Gorter *et al.*, 1999c; Te Brake, Eijkman, Hoogstraten & Gorter, in press). From these studies, it could be concluded that 13-

16% of the Dutch dentists had high overall levels of burnout, whereas 3% are, according to clinically validated reference norms, to be considered fully burned out while still working (Gorter *et al.*, 1999c). Whereas burnout among dentists deserves full attention, these studies also show that the majority of dentists do *not* suffer from burnout. Apparently, a large percentage of dentists experience their work to be stimulating and engaging. The question can be raised which ingredients of dental work are experienced by dentists to be buffering resources.

Job resources may be derived from studies on job satisfaction among dentists, of which Figure 1 shows a summary. It should be noted, however, that job satisfaction studies usually focus on factors causing dissatisfaction instead of satisfaction. Whereas job satisfaction describes aspects of work that are pleasurable, job resources are more than that; job resources function as a buffer and can be seen as opposite to job demands.

FIGURE 1. WORK RELATED FACTORS POSITIVELY INFLUENCING JOB SATISFACTION AMONG DENTISTS

Patient Contacts [a-d]
Technical results [a,b]
Sense of freedom [b]
Income [d,e]
Recognition / appreciation [c-e]
Professional growth [e]
Responsibility [e]
Non-chair side activities [c,e]
Staff contacts [d,e]
Quality of care [c-e]
Autonomy [c]
Professional environment [d]

References: [a](Eccles & M., 1967) [b](Flood Page & Slack, 1968) [c](Shugars, Dimatteo, Hays, Cretin & Johnson, 1990) [d](Rabiner, Shugars & Hays, 1994) [e](Chapko, Bergner, Beach, Green, Milgrom & Skalabrin, 1986).

In burnout studies among dentists, it was found that among those with higher burnout levels, expectancies about the reality of daily practice were unfulfilled (Gorter, 2000). In many cases, dentists with a tendency to be burnout prone indicated that a large part of their professional life was filled with occupational obligations that they had not chosen for. Examples of these obligations are: routine of work, staff management, administration, or high work pressure. These dentists felt they were not

able to control their practice in such a way that the satisfying or stimulating aspects of work could be given more attention. In fact, over the years, they often had lost track of what once motivated them to choose dentistry as a profession in the first place.

There is reason to assume that one way to prevent burnout is to create sufficient time or space for the implementation of satisfying, stimulating aspects of work. For dentists this would require a reflection on what is individually experienced to be stimulating work aspects and, subsequently, the evaluation whether these aspects are fulfilled sufficiently. By doing so, dentists at risk for burnout could be encouraged to implement some of these aspects in their own practice. The aim of the present study, therefore, is to make a step towards this preventive goal. To do so, first, an instrument was developed to measure job resources among dentists. Second, using this instrument, a rank order of job resources could be assessed that are considered to be the most rewarding in dentistry. Additionally, in order to further assess the construct validity of the instrument, a positive relationship between job resources and job satisfaction was hypothesized and tested.

Material and methods

PARTICIPANTS AND PROCEDURE

In 2001, of all Dutch dentists, 77% (N = 4429) was insured for disability for work at Movir Insurances (Source: Movir Insurances, unpublished report, 2001). By stratifying on gender, age, and region, a sample of 848 dentists-general practitioner from the Movir files was drawn which could be described as representative for the Dutch dental population. Furthermore, in order to maintain power of analysis in examining gender differences, an additional, separate group of female dentists (N=95) was approached.

MATERIAL

Job resources

From previous research on work stress and burnout among Dutch dentists, digitally stored open answers were available from 250 dentists on a question about aspects

contributing to working in a pleasant way. The response group, being roughly one-third of a larger sample, was well-comparable to the full sample with regard to burnout levels (Gorter et al., 1999c). By content analysis, and after consulting eight experts in the field of burnout and / or dentistry, four categories were constructed covering a total of 46 items: Patient contacts (10 items); Practice organisation (12 items); Immediate results of work (14 items); and General aspects (10 items). In the present study, all items were rated on a five point Likert-scale, ranging from 1 (not satisfying) to 5 (very satisfying). An example of an item is: "To what degree do you get satisfaction from being your own boss?". Summation of all items resulted in a total score for job resources, which resulted in a first draft of the Dentists' Experienced Job Resources Scale (DEJRS).

Job satisfaction

The Dentist Job Satisfaction Scale, or DJSS, is a measure of general job satisfaction. The DJSS originated from a four-item version for measuring job satisfaction among physicians (Van Dierendonck, Groenewegen & Sixma, 1992), and was modified and extended with one item for use among dentists in a previous study, showing satisfying psychometric qualities (Gorter et al., 1999b). An example of these items is: "I care for my work as much as ever before". A five point Likert-scale was used, consisting of five items with a score range from 1 (fully disagree) to 5 (fully agree), with a reliability coefficient of Cronbach's alpha = 0.85. All items contribute to the scale's reliability. Three items required reverse scoring in the analysis.

STATISTICAL ANALYSIS

Psychometric analysis of the DEJRS consisted of factor analysis (principal component analysis), internal consistency of subscales using Cronbach's alpha as reliability coefficient, and subscale correlations, corresponding with the first aim of the study. On the basis of these characteristics, adjustments were made if necessary, and mean scores were calculated for items and subscales, thus creating a list of job resources, in accordance with the second aim of the study. In an additional analysis, the hypothesized positive relation between DEJRS and DJSS scores was tested using Pearson product moment correlation coefficients. Where gender differences were

studied, the extra group of female subjects was included in analyses to increase statistical power. For the analyses of gender differences a multivariate analysis of variance (MANOVA) was used in which all DEJRS mean scale scores were entered. When a significant overall effect was found, subsequent univariate tests were used to isolate differences.

Results

Response

Of the representative group, a total of 497 dentists-general practitioner returned a useable questionnaire (58.6%), consisting of 372 males and 121 females (the gender of four dentists remained unclear). Mean age was 44.6 years (SD = 9.0). A comparison with data from the Dutch Dental Association shows that the sample reflects the Dutch dental population on gender with a margin of eight percent or less: males in sample formed 76%, in the population 82%; females in sample 25%, in the population 17% (Source: Dutch Dental Association, unpublished report, 2001). When age groups per five year were compared with the Dutch population, deviations ranged from 0.4% to 3.9%. Finally, the regional dispersion differed from the population with a variation from 0.2% to 2.3%, with one exception: in one region 5.7% less than expected was included in the response group. Of the additional group of female dentists that were approached, a total of 63 women (66.3%) responded.

Psychometric results

The factor structure of the DEJRS was examined using explorative factor analysis (PCA). Nine factors with an Eigenvalue larger than 1 could be extracted, accounting for 62.8% of the variance. One of these factors consisted of only one item ("The societal status and prestige of the profession"), which could be included in the factor entitled: "Material benefits". In table 1 all eight factors are listed. Each factor forms a subscale with satisfying to good reliability coefficients (Cronbach's alpha). As is shown in table 1, removing any item would not improve a subscale's reliability (alpha if item deleted).

TABLE 1. DENTISTS' EXPERIENCED JOB RESOURCES SCALE (DEJRS); RELIABILITY ANALYSIS (N=497)

	Reliability (Cronbach α)	Item-total correlat.	α when item deleted
FACTOR 1: "Idealism / Pride" (IP)	0.89		
1 Helping fellow men.		0.64	0.88
2 Being a good caregiver.		0.68	0.88
3 Solving problems.		0.72	0.88
4 The feeling of being of importance.		0.61	0.88
5 The combination of working with head, hands and heart.		0.60	0.88
6 The variation within the profession.		0.60	0.88
7 The profession in its own right.		0.63	0.88
8 Being proud of dentistry (beautiful tools / qualitatively high outcomes).		0.67	0.88
9 Finding a specific solution to a distinct problem.		0.58	0.88
10 The possibility to make use of up to date materials, skills and apparatus.		0.62	0.88
FACTOR 2: "Immediate results / Aesthetics" (IA)	0.88		
1 Delivering beautiful pieces of work.		0.73	0.85
2 Making a successful restoration.		0.69	0.86
3 Seeing a good treatment result.		0.76	0.85
4 Delivering high-quality work.		0.71	0.86
5 Doing esthetical work.		0.61	0.87
6 Good diagnosis and treatment.		0.65	0.87
7 The immediate satisfaction of work.		0.55	0.88
FACTOR 3: "(Long term) Patient results" (LO)	0.87		
1 Patients daring to smile again.		0.77	0.83
2 Patients using their teeth with pleasure again.		0.78	0.83
3 Gaining patients' trust.		0.68	0.85
4 Relieving patients' pain.		0.64	0.86
5 Reducing patient insecurity through aesthetic improvements.		0.61	0.86
6 Long term satisfaction from work; the positive effects of treatment on patients' oral health.		0.57	0.87
FACTOR 4: "Craftsmanship" (CR)	0.86		
1 Doing technical work.		0.75	0.81
2 Working manually.		0.75	0.81
3 Being happy to tinker.		0.67	0.83
4 Being creative.		0.68	0.83
5 Combining medical and technical aspects.		0.55	0.86
FACTOR 5: "Professional contacts" (PR)	0.76		
1 Keeping company with colleagues.		0.57	0.71
2 Participation in discussion groups or study groups on dental topics.		0.44	0.75
3 The possibilities for further development as a dentist.		0.58	0.71
4 The abundant possibilities for post graduate education.		0.49	0.73
5 Keeping company with staff.		0.50	0.73
6 The conveniences of the practice.		0.48	0.74

TABLE 1 (CONT). DENTISTS' EXPERIENCED JOB RESOURCES SCALE (DEJRS); RELIABILITY ANALYSIS (N=497)

	Reliability (Cronbach α)	Item-total correlat.	α when item deleted
FACTOR 6: "Entrepreneurship" (EN)	0.78		
1 Being one's own boss.		0.69	0.68
2 Being independent with regard to time management.		0.60	0.72
3 Freedom in pursuance of one's profession.		0.62	0.72
4 Being able to work efficiently due to modern technology.		0.46	0.79
FACTOR 7: "Patient care" (PA)	0.75		
1 Satisfaction or gratitude shown by patients.		0.55	0.69
2 Keeping company with people.		0.53	0.70
3 Children's enthusiasm and spontaneity		0.54	0.70
4 Setting fearful patients at ease and make them ready for treatment.		0.57	0.68
FACTOR 8: "Material Benefits" (MA)	0.76		
1 The assurance of having a good job and matching income.		0.65	0.63
2 The work area being conveniently arranged.		0.51	0.71
3 Financial rewards.		0.62	0.65
4 The societal status and prestige of the profession.		0.41	0.76

The relation between the subscales was investigated by examining the subscale intercorrelations, which ranged from r = 0.10 to r = 0.69 (Table 2). All correlations are positive, but vary in strength. Lowest correlations with other subscales are found among: Entrepreneurship, Patient care, and Material benefits. The correlations between several subscales and the total scale ranged from r = 0.57 to r = 0.88. These correlations are considered satisfactory, since subscales should measure separate aspects of work, but should also show a fair amount of common variance.

TABLE 2. PRODUCT MOMENT CORRELATION COEFFICIENTS: DEJRS SUBSCALES AND TOTAL SCALE, AND DJSS

	IA	LO	CR	PR	EN	PA	MA	DEJRS	DJSS
Idealism / Pride (IP)	0.69	0.60	0.57	0.61	0.37	0.45	0.43	0.88	0.53
Immediate results / Aesthetics (IA)		0.63	0.55	0.45	0.33	0.42	0.33	0.79	0.37
(Long term) Patient Results (LO)			0.47	0.42	0.31	0.60	0.25	0.75	0.38
Craftsmanship (CR)				0.40	0.25	0.35	0.21	0.69	0.31
Professional Contacts (PR)					0.36	0.35	0.43	0.74	0.45
Entrepreneurship (EN)						0.10	0.51	0.57	0.23
Patient Care (PA)							0.13	0.57	0.43
Material Benefits (MA)								0.58	0.24
Total DEJRS									0.54

All pmcc's: $p < .01$, except EN-PA: $p < 0.05$.

MEANS AND STANDARD DEVIATIONS

Table 3 shows the means and standard deviations for each DEJRS subscale, and for the total DEJRS score. Highest mean scores are found at "Immediate results / Esthetics" (M = 4.04), and "(Long term) Patient results" (M = 4.03). Multivariate analyses using MANOVA indicated statistical significant gender differences in means: $F(9,540)= 5.272$, $p < .001$. Subsequent univariate analyses showed female dentists having higher means than males on (Long term) patient results ($F(1,548)=10.428$, $p=0.001$), and Patient care ($F(1,548)=11.036$, $p<0.001$). Remarkably, female dentists showed higher absolute mean scores on all subscales but one (Entrepreneurship).

TABLE 3. MEAN SCORES (AND STANDARD DEVIATIONS) OF SUBSCALES AND TOTAL SCALE DEJRS (RANGE 1-5)

	Total N=491-493		Men N=369-372		Women** N=181-183	
	M	SD	M	SD	M	SD
Idealism / Pride	3.65	0.59	3.64	0.58	3.65	0.61
Immediate Results / Aesthetics	4.04	0.52	4.00	0.53	4.09	0.51
(Long term) Patient Results*	4.03	0.59	3.98	0.59	4.16	0.57
Craftsmanship	3.77	0.72	3.72	0.70	3.80	0.78
Professional Contacts	3.03	0.69	3.03	0.71	3.06	0.68
Entrepreneurship	3.55	0.85	3.55	0.83	3.50	0.88
Patient Care*	3.90	0.59	3.81	0.57	4.12	0.56
Material Benefits	3.05	0.74	3.03	0.76	3.11	0.72
Total	3.65	0.46	3.62	0.46	3.70	0.46

*Statistical significant gender differences ($p < 0.01$).**Including extra group of female dentists.

TABLE 4. TOP-TEN STIMULATING ITEMS DEJRS; MEAN SCORES (M) AND STANDARD DEVIATION (SD) (RANGE 1-5)

Factor		Total N=491		Men N=371		Women* N=182	
	Item	M	SD	M	SD	M	SD
IA	Seeing a good treatment result.	4.15	0.63	4.12	0.66	4.20	0.58
IA	Good diagnosis and treatment.	4.13	0.63	4.11	0.64	4.15	0.60
LO	Relieving patients' pain.	4.13	0.69	4.11	0.70	4.16	0.72
IA	Delivering high-quality work.	4.13	0.66	4.09	0.67	4.18	0.65
IP	Finding specific solutions to distinct problems.	4.09	0.64	4.06	0.62	4.11	0.73
PA	Expressions of satisfaction or gratitude by patients.	4.08	0.71	4.02	0.71	4.23	0.65
IA	Delivering beautiful pieces of work.	4.07	0.67	4.03	0.69	4.14	0.62
LO	Gaining patients' trust.	4.07	0.70	4.02	0.72	4.23	0.62
IP	The combination of working with head, hands and heart.	4.04	0.85	3.98	0.85	4.16	0.83
LO	Patients using their teeth with pleasure again.	4.03	0.80	3.98	0.80	4.19	0.77

Note: Rank order is based upon total scores. Underlined are highest means among males and among females. *Including extra group of female dentists.

Table 4 shows the ten individual DEJRS items with highest mean scores, representing the specific work aspects that are felt to be most rewarding. Although these items have highest mean scores, the difference in means between #1 and #10 is only 0.12 points, which, on a 5-point scale, may be considered small. The mean scores range from 2.45 to 4.15.

Relation with job satisfaction

With regard to the relation between job resources and job satisfaction, all subscales of the DEJRS showed a positive correlation with job satisfaction, as measured by the DJSS (Table 2). As can be seen, highest correlations are found between job satisfaction and Idealism / Pride, while lowest are found between job satisfaction and Entrepreneurship and material Benefits.

Discussion

The Dentists' Experienced Job Resources Scale (DEJRS) appears to represent a valuable and psychometrically sound instrument to monitor job resources as experienced by dentists-general practitioner. Among Dutch dentists, especially immediate results and aesthetics, and long term results of working with patients were considered positively inspiring aspects of work. Also patient care in general and craftsmanship were among the aspects considered most rewarding. As expected, a positive correlation was found between job resources and job satisfaction, thus underscoring the validity of the DEJRS as a valuable measure of work related well-being. Job satisfaction most strongly correlated with the idealism and pride dentists find in and gain from their work, as well as the possibilities dentistry gives for professional contacts and patient care.

The eight subscales of the DEJRS show good reliability coefficients. The subscales each have a specific distinctiveness, whereas, simultaneously, the total scale clearly shows consistency. The fact that a representative sample of Dutch dentists contributed to the DEJRS further validates its usefulness. In psychometric terms the instrument serves its purpose, which is to identify aspects of work that are considered rewarding and stimulating by dentists.

When studying the rank order of the DEJRS, as experienced by Dutch dentists, it appears that results of dental work, either short term or long term, are considered of high importance. Although this may seem an obvious element of dental work, it should be noted that in many professions, including health care, the results of one's own work are often not that obvious. Within dentistry, however, a good performance is usually translated in visible results. It is worth emphasizing that this specific aspect of the dental profession can be considered a strong job resource. Even more so, bringing a successfully finished difficult restoration explicitly to the patient's attention too, may also increase the chance of receiving a patient's gratitude, thus stimulating another job resource.

An aspect that scores high in the rank order of resources is patient care. Although it has been stated that patients can be a burdensome part of the dental profession (Gorter *et al.*, 1999b), they also appear to be a significant rewarding factor. Especially female dentists do experience patient care to be a highly resourcing factor.

Another aspect that deserves some comments is entrepreneurship. Intuitively, stereotypically speaking, it would not have been a surprise if males had shown higher means than females on this aspect, which, however, is not the case in the present study. Apparently, both among male and female dentists aspects such as building up a practice, being independent and one's own boss are highly valued. At the same time, financial aspects have also been described to be a stress factor for dentists (Gorter *et al.*, 1999b). Government regulation, high taxes, high investments, et cetera can be burdensome. As shown by the somewhat higher standard deviation on entrepreneurship, not all dentists see this facet as a major resource.

Although the DEJRS appears to be a valuable instrument for measuring job resources among dentists, it should be understood that, at present, it still needs further validation. The survey was among Dutch dentists solely, and no comparison has been made so far with dentists from other countries. It is therefore strongly encouraged to administer the instrument among dentists in other countries. When doing so, careful adaptation to the country's specific circumstances needs to be taken care of. A small-scale pilot study preceding a nation-wide administration is recommended, in the form

of an open-ended question in which subjects are invited to fill in their personal resourcing topics, if not listed already.

It is suggested, as was done in the Introduction part of this paper, that specific resources may be a factor in burnout prevention. According to organizational psychologists, "... individuals strive to obtain and maintain that which they value, these things being termed 'resources'." (Hobfoll & Freedy, 1993). Resources function as a 'buffer' that protects from getting depleted and exhausted by losing energy, since the resources actually deliver energy. Psychological stress occurs when resources are threatened, when they are lost, or when individuals invest in resources and do not reap the anticipated level in return. What has been achieved in the present study was a detailed description of resources in dental practice. Dentists giving energy while practising need to "reload their batteries" regularly. One of the ways in which this can be done is by making sure work provides them with resources, as described. Dentists who feel they are getting more and more depleted, should evaluate their daily work contents and actively create time or space for stimulating, rewarding resources to be part of it.

As a suggestion for use of the DEJRS, the following may be of interest. Recently, the Dutch Dental Association opened a so-called "Stress thermometer" at her Internet website (Te Brake *et al.*, in press). The thermometer contained a self-check on burnout and dental stress factors. Dutch dentists were invited to fill in this questionnaire anonymously and immediately received computerized personal feedback. Dentists' participation level was high, and participants highly valued the use of the thermometer. The instrument was only open for access during half a year, and at present it is under study in which way the thermometer could be open for use again. The DEJS is certainly to be a valuable ingredient of a future website as such. When dentists see which aspects of work they value, it must make them reflect on whether they create enough changes to have these aspects to be part of their job and may act accordingly. With the aim to stimulate burnout prevention, dental associations could consider to initiate such a thermometer for their members.

CHAPTER 9

Summary and general discussion

As described in the introduction, this thesis was organized around three aims. In the present chapter these aims –the occurrence and development of burnout, possible preventive possibilities, and conceptually new ways to improve working conditions among Dutch dentists– are reviewed and integrated. First, the findings presented in the previous chapters are summarized. These findings are subsequently reflected on in a theoretical and practical sense, also leading to some recommendations for future research.

Summary of findings

The main focus of chapter 2 was to further strengthen the applicability of the Maslach Burnout Inventory (MBI) among dentists. To this end, the factor structure of the Dutch version of the MBI was examined in two independent, representative samples of Dutch dentists. Findings were subsequently compared to those found among other entrepreneurs within health care (i.e., general practitioners and physiotherapists). The results indicated that the three factor structure of the MBI (i.e., emotional exhaustion, depersonalisation and personal accomplishment) fits best within a sample of dentists-general practitioner. This strengthens the conclusion drawn by Gorter, Albrecht, Hoogstraten and Eijkman (1999a) that the MBI can be considered a suitable instrument for use among dentists.

An additional aim of chapter 2 was to examine the chronological development of the three burnout components. Knowledge of the chronological sequence in which these components emerge can provide important information for theoretical development and possibilities for intervention. Three proposed sequence models for the MBI-subscales were compared using Structural Equation Modelling (SEM).

Although no one model of sequence showed a particularly good fit, results from both samples indicated a preference for a sequence of emotional exhaustion → depersonalisation → personal accomplishment.

The study described in *chapter 3* is an extension on the study on sequence described in chapter 2. To further examine the inferred causality between the three burnout components, a longitudinal design was used, in which a sample of dentists was examined in two waves, with a 3-year interval. Special precaution was taken to address the issue of wave nonresponse, which is an ubiquitous, but relatively sparsely addressed problem within longitudinal research. In line with the second aim of chapter 2, the fit of several chronological models proposed in earlier research was compared using SEM. Results indicate that the original model suggested by Maslach and Jackson (1981) (emotional exhaustion → depersonalisation → personal accomplishment) showed an adequate fit, thereby replicating the findings of chapter 2. However, an alternative model (personal accomplishment → emotional exhaustion → depersonalisation) also had a good fit. An exploratively constructed and empirically based 'best fitting' model indicated that emotional exhaustion could not be discarded as an early sign of burnout. Also, personal accomplishment varies in the position it takes in relation to emotional exhaustion. Taken together, results from chapters 2 and 3 indicate that the theoretically proposed three-factor structure of the MBI also is valid among dentists. Furthermore, results indicate that heightened levels of emotional exhaustion are an important early sign of burnout, while low levels of personal accomplishment can also be taken as a signal of warning.

Subsequently, in chapters 4, 5 and 6, more attention is given to aspects of prevention and intervention. A 'generic' aspect that is sometimes used to explain differences in levels of burnout is gender. Differences between the sexes in the manifestation of burnout have been reported for different occupational groups. Although some gender-specific explanations for this finding have been forwarded, there is a paucity of studies in which the relation with other work-related gender differences is examined. The objective of *chapter 4* was to analyse gender differences in burnout among dentists and to identify possible concomitant factors. In line with earlier findings, male dentists reported higher levels of depersonalisation than female

dentists. No gender differences were found on emotional exhaustion and personal accomplishment. Moreover, no gender-related differences were found in experienced work-stress or health-related aspects. It *was* found, however, that male dentists put in more working hours and see more patients per week when compared to female dentists. In addition, a difference in mean age between male and female dentists was found. The main finding of chapter 3 was that the difference in depersonalisation disappeared when controlling for working hours and age. Thus, although gender differences in burnout among dentists do exist, underlying factors, such as working hours, have a profound influence on these differences. These results have direct practical consequences, for instance in distinguishing between groups concerning the way burnout scores are interpreted.

In a study by Gorter, Eijkman and Hoogstraten (2001), positive effects of a career counselling intervention program were found. In *chapter 5*, a one-year follow-up study on the effectiveness of the intervention program is described. Initially, a 'burnout risk group' was identified, that received personal feedback on their burnout scores and was invited to participate in the intervention program. The participants were approached again one year later. While demonstrating an improvement on all burnout subscales directly following the program, results show that the program participants showed a relapse one year later. However, a control group that indicated to have taken preventive action on its own initiative reported a beneficial effect in the long run. Controls that did not take any preventive action showed little or no progress.

Given the effectiveness of personal feedback, demonstrated in chapter 5, efforts were made to develop a convenient instrument to provide such feedback to the dentist-general practitioner. The Stress Thermometer is an easily accessible Internet-based instrument for feedback on work stress and burnout. In *chapter 6* the development of this instrument was described, and its applicability among dental practitioners was determined. During an evaluation period of five months at least 12% of all possible respondents made use of the Stress Thermometer. Descriptive characteristics of the response group, as well as levels of burnout and work stress, corresponded with those found in the Dutch dentist population although some deviations were also present. These results indicate the applicability of the Stress Thermometer to a representative

variety of dentists. Although the deviations found should not be ignored in future use, the Stress Thermometer was successful in reaching a population that is difficult to reach. It effectively calls attention to sensitive personal issues concerning work-related stress and burnout, which are not easily discussed otherwise.

Chapters 7 and 8 explore additional ways to improve the working experience of dentists. In *chapter 7* the combination of burnout and engagement among dentists is investigated. It was found that the hypothesized three-factor structure of engagement (vigor, dedication and absorption) as measured by the Utrecht Work Engagement Scale (UWES) could be confirmed among dentists. Furthermore, engagement related negatively to burnout. However, analysis using SEM revealed that a model consisting of a reduced ('core') burnout factor (emotional exhaustion and depersonalisation) and an enhanced engagement factor (consisting of the three UWES factors: vitality, dedication and absorption plus the burnout-subscale personal accomplishment) showed the best fit. Although these findings were somewhat contradictory with theoretical presumptions, the results were similar to those found in earlier studies. Overall, the outcomes of this study indicate the applicability of an engagement questionnaire to measure job engagement among dentists.

The aim of *chapter 8* was to develop an instrument measuring actual job resources among dentists, and to assess the relative importance of these resources. Additionally, job resources were related to job satisfaction. Factor analysis (PCA) on the *Dentists' Experienced Job Resources Scale* (DEJRS) resulted in eight factors, representing distinguishable categories of job resources. In rank order these were: Immediate Results / Ethics; (Long term) Patient Results; Patient Care; Craftsmanship; Idealism / Pride; Entrepreneurship; Material Benefits; and Professional Contacts. All subscales showed a positive correlation with job satisfaction. It was concluded that the DEJRS is a valuable and psychometrically sound instrument to monitor job resources as experienced by dentists-general practitioner. It is assumed that the stimulation of greater awareness of job resources serves a major contribution in burnout prevention.

General discussion

1. On burnout among Dutch dentists: levels and significance

In table 1 the MBI scores found among Dutch dentists are shown as found in 1997, 2000, and 2001. Each MBI subscale score relates to the frequency dentists experience certain feelings; a score of '0' means 'never', while '6' should be interpreted as 'every day'. The results in table 1 can be interpreted accordingly: (1) Dentists are 'now and then (once a month)' emotionally exhausted (score range 1.7 – 1.8); (2) 'sporadically (a few times a year)' they have feelings of depersonalisation (score range 1.2 – 1.3 for men, 1.0 – 1.1 for women); (3) Dutch dentists '(very) often (at least once a week)' feel competent (score range 4.3 – 4.4). Furthermore, no evident trends emerge from the results in table 1, either positive or negative. These relatively favourable results could easily lead to the conclusion that continued attention for burnout prevention among dentists is unjustified.

Table 1. Mean burnout scores (M) and standard deviation (SD) among Dutch dentists in 2001, 2000 en 1997

	2001[a]		2000[b]		1997[a,b]	
	M	SD	M	SD	M	SD
Emotional exhaustion	1.8	1.1	1.7	1.1	1.7	1.1
Depersonalisation (men)	1.3	0.8	1.3	1.3	1.2	1.2
Depersonalisation (women)	1.0	0.7	1.0	0.7	1.1	0.7
Personal accomplishment	4.4	0.9	4.3	0.8	4.4	0.8

[a]This thesis; [b]Based on Chapter 5, Table 1.

However, there are a number of reasons to declare such a conclusion inappropriate. For one, it is expected that high levels of burnout can lead dentists to prematurely stop active practice. As a result, the results in table 1 are likely to be positively biased because they are established among dentists that are actively at work in practice. Second, as was also noted by Gorter et al. (1999c), levels of emotional exhaustion are very high among those in the higher regions of the burnout scale. Moreover, about 3% of all working dentists score extremely unfavourable on all MBI scales. Third, using the norm scores described in the UBOS manual to reanalyse the results reported by Gorter et al. (1999c), it was found that in 1997, 11.3% of the response group could be categorized as being at high risk for burnout. Using the same norms for the studies described in this thesis, in 2000 and 2001, these percentages were 14.1% and 15.8%,

respectively. Thus, the percentage of dentists that is 'at risk' for burnout seems to be steadily increasing. These arguments warrant continued research on and attention for burnout and work related stress among dentists.

2. On distinguishing burnout from burnout

When trying to make practical inferences on burnout research one is confronted with the distinction between burnout as a psychological, scientifically operationalized construct, and its existence as a clinical diagnosis. The fact that there is a non-equivalence between scientific and clinical approaches to health related issues is hardly surprising (and, concerning burnout, has been considered in some detail by Schaufeli & Enzmann, 1998). A clinical definition assumes a dichotomous situation – one either does or does not have burnout – while the MBI uses a (7-point Likert type) continuous scale. Although some evidence exists that it is feasible to combine the three MBI-subscale scores to form dichotomous conclusion (Brenninkmeijer, 2002), on an individual level the question remains: on a scale from 0 to 6, where does burnout begin? As people differ in the ways that they are able to 'cope' with stressors in the working conditions, conceptually, they will also differ in the level of stress that leads to burnout.

It could be argued that burnout is 'revealed' when symptoms – avoidance behaviour, relational problems, or health complaints – occur in such severity that normal functioning is no longer possible. Unfortunately, the actual symptoms 'revealed' are probably also highly different between individuals, as is also indicated by the following example. 'Vinger aan de pols' is a popular Dutch television programme that on a weekly basis reflects on various health-related issues. In an episode about burnout[18], three well-known Dutch celebrities discussed their often very personal problems. All attributed their problems to a burnout, and all agreed that an overflowing work schedule and extreme work dedication lay at the root of their problems. However, it was interesting to note how very different the actual symptoms described were. These ranged from sexual dysfunction to not being able to actually

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[18] AVRO's *Vinger aan de pols*, aired June 24, 2003.

perform tasks pertaining to work. If these people were all correctly diagnosed as 'burned out', while the actual symptoms reported are of such diversity, is it even possible to talk about one, single burnout?

It is not surprising to find that people diagnosed as being 'burned out' display a varying set of symptoms. What is more, in their examination of a wide diversity of studies on burnout, Schaufeli and Enzmann (1998) enumerated no less than 132 possible symptoms! To extend this issue to the dental situation, some additional analyses were performed. Interviews were analysed of thirty dentists that suffered from burnout, or who had burnout related complaints[19]. In the analysis, attention was given to the actual physical symptoms named by the interviewees. In line with the above, it was expected that actual reported symptoms would vary to a large degree. Surprisingly, however, an opposite picture emerged. All interviewed dentists mentioned some unwillingness to go to work, or reluctance in the prospect of having to continue practicing for another couple of decades. Furthermore, a variety of general stress complaints, exhaustion, headaches, and some psychological problems were mentioned. These symptoms, of course, are typical for the emotional exhaustion component of burnout, which can be seen as an orthodox stress variable. However, the majority of these dentists (>50%) mentioned physical problems particularly related to ergonomics (lower back pain, neck pain). These findings coincide with the results of a large field study that was specifically aimed at improving the ergonomic aspects of dental work[20]. In this study, it was found that many of these dentists also reported a large number of psychological problems (often summarized as 'burnout-related complaints'). Thus, it seems that in dentistry, the most frequent physical symptoms relating to work stress and burnout specifically lie in the sphere of ergonomics.

In standardizing the burnout measurement, the MBI in fact presupposes identical symptoms in different people. However, it is generally agreed upon that, at an individual level, an MBI score has only limited significance; it is impossible to express the diversity of burnout related problems in a score on emotional exhaustion,

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[19] For a further description of these interviews, see Gorter (2000, p. 172).
[20] Project *SONDE*, Movir/Terzet (1999). Unpublished findings.

depersonalisation and personal accomplishment. Only when incorporated with a number of other aspects (physical tests, opinions of family, colleagues, friends, etc.) a personal indication can be obtained. In this context, the relative consistency of reported symptoms in the dental population is of interest. When among dentists, complaints reveal themselves predominantly at an ergonomic level (which is commonsensical in this occupation), perhaps such generalizations can also be made within other professions. Burnout results on the occupational level are measured on group level, thus validating the use the MBI. At the same time, these results can be of direct importance to individuals within the occupational population, which is underlined (in case of dentistry) by a practical application such as the Stress Thermometer (see chapter 6). This calls for the development of tailor made instruments, like the Stress Thermometer, for different occupations.

3. On distinguishing burnout from related terms

The extend to which burnout can be distinguished from other, intuitively comparable phenomena like work stress, depression, anxiety, and chronic fatigue has often been discussed (e.g., Bakker, Schaufeli, Demerouti, Janssen, Van der Hulst & Brouwer, 2000a; Glass & McKnight, 1996; McKnight & Glass, 1995; Schaufeli & Enzmann, 1998). Burnout does not readily relate to any of the criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV, American Psychiatric Association, 1994). Although the International Classification of Diseases (ICD-10, World Health Organization, 1992) defines a work related neurasthenia, its criteria only to a certain degree overlap with the complete, three-fold definition of burnout.

One argument to justify the distinctive position of burnout is that it occurs within a very specific context; it is by definition job related. Depression on the other hand, is more persuasive and 'context-free'[21]. In their study among teachers, Bakker *et al.* (2000a) found that burnout can be an antecedent of depression. According to these authors this is indicative of depression as a more generalized phenomenon in comparison to burnout. There is also empirical evidence that burnout can be

[21] To illustrate, burnout has been dubbed 'professional depression' by Oswin (1978, in: Schaufeli and Enzmann, 1998).

distinguished from depression. Confirmative factor analysis can discriminate between depressive components (as measured using the CES-D) and the three MBI components. The reported variance shared between emotional exhaustion and depression varies between 20% (Glass & McKnight, 1996) and 31% (Bakker *et al.*, 2000a), whereas the correlation between depression and depersonalisation and personal accomplishment is much lower. Another reason used to differentiate burnout from related terms is the fact that its definition includes depersonalisation and personal accomplishment. Whereas exhaustion is an orthodox reaction to averse circumstances, the inclusion of the other two components implies that burnout differs from depression, fatigue or stress (Cordes & Dougherty, 1993; Schaufeli & Van Dierendonck, 1993).

Interestingly, recent developments somewhat undermine these arguments. In the last decades, the scope of applicability of the MBI has widened to various occupations, thereby going beyond its former 'target' population of human services professions. As this development continues, the 'context argument' will increasingly lose meaning. To illustrate, versions for university students have recently been developed (Schaufeli & Bakker, 2003b; Schaufeli *et al.*, 2002a, see also below). Although among students stress, exhaustion, depression, and perhaps even burnout undoubtedly occur, it will become somewhat awkward to differentiate 'burnout' within such a population. In addition, findings in this thesis weaken the conceptual importance of personal accomplishment. Among dentists it was found that personal accomplishment develops relatively independently from emotional exhaustion and depersonalisation (see Gorter, 2000, and chapters 2, 3, and 7), while the latter are often regarded as the 'core' of burnout. Thus, in deviating from the original context and definition proposed by Maslach and Jackson (Maslach & Jackson, 1981), some of the more distinguishable attributes of the definition of burnout are lost.

With the introduction of job engagement a related question arises: are burnout and engagement conceptual opposites, or should they be considered in their own right? As was concluded in chapter 7, the *constructs* burnout and engagement can be defined as each other's opposites, but this does not necessarily mean they are also mutually exclusive. Some level of engagement can exist while at the same time certain

aspects of a pending burnout may be surfacing. This is inherent in the way burnout is measured (i.e., the MBI uses measures of frequency). Thus, on a conceptual level, it seems warranted to see the two concepts as separate, but negatively related constructs. However, in examining the two constructs, the position of the personal accomplishment component has come under further scrutiny. It appeared that this subscale, traditionally linked to the burnout construct, better 'fitted' with engagement. A possible explanation for this effect (outlined in chapter 7) was the deviating way the personal accomplishment scale is phrased in comparison to both other scales.

To explore this issue further, a study among psychology students was employed[22]. A total of 292 subjects were divided in two groups. Group 1 completed a version of the MBI in which the three subscales were phrased as in the original version (i.e., negatively phrased items on the emotional exhaustion and depersonalisation scales, positively phrased items on the personal accomplishment scale). Group 2 filled in an adapted version of the MBI, in which all items, including those pertaining to personal accomplishment, were phrased negatively. Results indicated that the interscale correlations between the subscales were substantially higher in group 2 than in group 1. This signifies the effect of the (positive or negative) direction of item phrasing; same-direction item phrasing leads to higher correlations than opposite-direction item phrasing.

As an extension of this study, another study among students was performed. An identical methodology was used as in the Bouman *et al.* (2002) study, but this time a version of the UWES was included in the questionnaire. Table 2 shows the resulting interscale correlations. Within the MBI subscales, the correlations were much higher in group 2, thereby again demonstrating the pronounced effect of the rephrasing of the personal accomplishment subscale. The correlations of the originally phrased personal accomplishment scale were positive and moderately high with all UWES scales, and higher than the correlation with both other MBI scales (which is in line with the results found among dentists, see chapter 7). The correlations of the UWES with the

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[22] This study was published as Bouman, AM, Te Brake, JHM and Hoogstraten, J (2002). Significant effects due to rephrasing the Maslach Burnout Inventory's personal accomplishment items. *Psychological Reports*, *91*, 825-826.

rephrased personal accomplishment scale did not deviate much in comparison to group 1; obviously, the correlations are inverted, but their absolute values are only slightly reduced. However, in group 2 the correlation of personal accomplishment with depersonalisation is much higher than its relation with any of the UWES scales. This indicates that the phrasing of the personal accomplishment scale is indeed an important factor in determining whether it 'belongs' to burnout or to engagement. Therefore, the issue of item phrasing should be explored further in future research, and the relative position of the personal accomplishment scale within the MBI, but also in relation to engagement, should be interpreted with care.

TABLE 2. INTERSCALE CORRELATIONS FOR THREE SUBSCALES OF THE UBOS AND THE THREE SUBSCALES OF THE UBES, ADAPTED FOR STUDENTS, FOR TWO CONDITIONS

Group 1 (N=119)	D	PA+	VI	DED	AB
Emotional exhaustion	0.28*	-0.01	-0.03	-0.05	0.13
Depersonalisation		-0.37*	-0.53*	-0.72*	-0.56*
Personal accomplishment+			0.63*	0.54*	0.50*
Vitality				0.68*	0.75*
Dedication					0.67*
Group 2 (N=123)	D	PA-	VI	DED	AB
Emotional exhaustion	0.30*	0.36*	-0.15	-0.02	0.00
Depersonalisation		0.62*	-0.40*	-0.66*	-0.37*
Personal accomplishment–			-0.51*	-0.45*	0.43*
Vitality				0.67*	0.81*
Dedication					0.70*

Note: D=depersonalisation; PA+ =personal accomplishment, positively phrased items; PA– =personal accomplishment, negatively phrased items; VI=vitality; DED=dedication; AB=absorption. *p<0.01

4. ON BURNOUT PREVENTION AND INTERVENTION

Several issues concerning the practical prevention of burnout among dentists are described in chapters 4, 5, and 6. The study described in chapter 4 has shown that although a distinction on the basis of gender does indicate differences in levels of burnout, these differences (specifically: women, less than men, develop a cynical and distant attitude to their patients) appear to be related to differences in their actual working situation (number of working hours and treated patients). In line with the structuralist approach, as discussed by Cleveland (2000), these results indicate that the gender differences found are a reflection of different working conditions. This, in turn, implies that it would be unwise to use gender as a criterion to differentiate between burnout risk groups.

In view of prevention and intervention, the results found in chapter 5 are of particular interest. In chapter 5 several explanations are given for the lack of favourable long-term effects in burnout levels of a career-counselling program for dentists. More revealing, however, were the positive results found among the control group that indicated to have taken preventive steps on their own account. These dentists probably found specific aspects to alleviate their situation, most of which concerned specific changes made in the direct working environment. In light of these results, and considering that the trigger to take action apparently lies in the availability of specific feedback, the development of the Stress Thermometer was an obvious and practical further extension. In addition to its description and discussion in chapter 6, three general annotations can be made considering this Internet based self-assessment instrument.

In a practical sense, what is the value of the Stress Thermometer as a diagnostic instrument? In the situation described in chapter 6, feedback is given in comparison to norms within the occupational group, thus making a *relative* comparison. A more absolute indication of the level of burnout can be attained by comparing the respondent's score to the norms that are available (e.g., Schaufeli & Van Dierendonck, 2000). However, the Stress Thermometer was not designed to provide such absolute conclusions, as is also discussed in the following paragraph. The responsibility of coming to the 'correct' conclusion remains the dentist's, and the information from the Stress Thermometer is only one of the aspects that can help dentists develop this conclusion. The acceptance of behavioural change, and the instigation of necessary adjustments to make a change possible, are alleviated by the congruence of self-evaluation on the one hand, and external judgments on the other (McDonald & Boud, 2003). Ideally, these external judgments (by family, friends, colleagues, assistants) should already in itself have 'primed' the dentist to some level of realization about a pending burnout. However, more often than not, external warnings provide inadequate incentive to make actual changes to prevent further downfall. This is particularly true in the situation of the dentist-general practitioner. Financial commitment and the

inability to change career perspective can lead to feelings of being 'trapped'[23], thus preventing the dentist from even considering work-related changes. Also, in most cases there are relatively few colleagues that could help clarify a potentially hazardous situation. Furthermore, it has been suggested that most dentists may simply feel embarrassed by the thought of seeking professional help (Rada & Johnson-Leong, 2004). Instruments like the Stress Thermometer could add the, scientifically supported, factor of self-evaluation to the equation.

A related issue concerns the manner in which the burnout-feedback itself was derived. Combining the results on the three MBI subscales to one single outcome (i.e., respondent is / is not at risk) is not without controversy (Brenninkmeijer & Van Yperen, 1999, also discussed in the previous section). However, although a combination of scores is necessary for an overall judgment, the separate results on emotional exhaustion, depersonalisation and personal accomplishment were also made available to the respondent. Also, research suggests that the criterion used (i.e., high levels of emotional exhaustion and depersonalisation and/or low levels on personal accomplishment) is indeed an effective categorization in mapping differences between individuals high and low in burnout (Brenninkmeijer, 2002). Finally, in the Stress Thermometer, no direct conclusions were drawn from the MBI scores. Even if the respondent was categorized as 'high risk', it was emphasized that this conclusion is the resultant of a "random indication, which could be highly influenced by temporary factors" (see chapter 6, box 1). Hence, although the problems concerned with a combination score are recognised, it is reasonable to assume that the use of a combination score in the Stress Thermometer is warranted.

A final remark about the Stress Thermometer concerns an ethical issue on the direct feedback dentists received. Freud himself did not consider it wise to provide patients with an uninvited analysis. He saw an essential distinction between someone who actively searches for help, and help that is unsolicited forced upon someone. The patient, when not psychotic or suicidal, should himself make a first effort, thereby performing an important aspect of the overall therapy. (Moreover, to be fully certain

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[23] Descibed by Gorter (2000) as 'the golden cage' (p.177).

of commitment to therapy, Freud proposed a financial contribution to be mandatory.) Of course, the dentists responding to the Stress Thermometer are well aware they are doing a test on work stress and burnout (which in itself is often considered an important first step for improvement). Nevertheless, a possible negative outcome can cause some concern, and care should be taken not to alarm the dentist, and then leave it at that. Therefore, in the current setup, an external link was given to direct the dentist to more specialized help (see chapter 6). It was found, however, that during the evaluation period very few dentists actually made use of this possibility. It is not clear what the cause of this result is. Perhaps there is too great a leap from the relatively anonymous surroundings of the Stress Thermometer to the actual process of contacting professional help (which would be in line with findings by Rada & Johnson-Leong, 2004). To overcome this threshold, in future developments personalised help can possibly be incorporated in the Stress Thermometer itself. For instance, in the Netherlands an Internet-based therapy has been developed (www.interapy.com), which offers an easily accessible, interactive way for psychological help through the Internet (see, e.g., Lange, Van de Ven, Schrieken & Smit, 2004, for an example on the issue of burnout). A combination of the Stress Thermometer with such a digital provision seems an obvious possibility for future extension.

5. On measuring positive aspects

Over the last decade, social research among dentists has predominantly focussed on negative aspects in work. An important aspect of this thesis is its aim to introduce a more positive focus within dental research tradition. As outlined in chapters 7 and 8, this is in part a consequence of a more general trend within psychology to change attention from the predominance of the negative to a more positive outlook. In this section, some issues concerning these new concepts will be further examined.

Can the study of positive aspects within the dental setting provide a valuable addition to research on prevention and intervention of burnout? Given the results from a recent study on the interaction of job demands, job resources, burnout and job engagement, it would appear not. In their study, Schaufeli and Bakker (2004, p.311)

conclude that "...from a preventive point of view, decreasing job demands is to be preferred above increasing job resources." Although it was found that these aspects did have a positive effect on levels of engagement, their rather small influence on turnover intention led the authors to the conclusion quoted above. However, given the very different nature of their study, it remains questionable whether a generalization of this conclusion is warranted. Most importantly, the use of an outcome measure like turnover intention is not particularly fitting within a dental setting. The average dentist experiences a high threshold for a career shift because of the financial and social status, and the obligations towards patients. The feeling that there is no perspective of a career outside dentistry, withholds most dentists from even considering leaving the profession (Gorter, 2000). It is therefore particularly important for the dentist not to lose sight of the pleasurable, positive aspects in dentistry.

Another aspect of the Schaufeli and Bakker (2004) study pertains to the operationalization of job resources. Job resources were equated to rather unspecific aspects (i.e., performance feedback, social support, and coaching). For the typical dental setting, these measures are relatively useless. For instance, dentists are professional entrepreneurs within health care, and in the Netherlands, approximately 70% of these dentist run a solistic practice[24]. Social support and feedback are therefore no ideal way to operationalize job resources, as they are not easily transposed to the dental situation. For most working people, a 'feedback network' is present, consisting of colleagues, superintendents, and company doctors. Inasmuch as such a feedback network is available for the dentist, it will be much smaller, and no formal equivalent for a company doctor exists. Thus, the *absence* of clear feedback on the actual dental work, and the lack of social support and coaching are typical work demands within the dental setting.

It then follows that further specification is needed to determine the dentists' job resources. This has resulted in the Dentists' Experienced Job Resources Scale (DEJRS, described in detail in chapter 8). With the development of the DEJRS, an alternative, more concrete interpretation of the concept of job resources was

[24] Percentage of Dutch dentists that had complete solistic ownership of the dental practice in the spring of 2004. Results provided by the Dutch Dental Association (NMT).

developed. Simultaneously, the three general aspects used by Schaufeli and Bakker (2004) are comprised in the DEJRS, albeit in a dental specific manner. For instance, performance feedback is included in such items like "Satisfaction or gratitude shown by patients" (directly), "Gaining patients' trust", and "Seeing a good treatment result" (indirectly). In line with the reasoning presented earlier, it is hoped that by examining concrete, occupation-specific job demands and job resources, a more accurate portrayal of these demands and resources in dental practice can be attained.

6. On future research on the working conditions of dentists

Longitudinal research, such as described in chapter 3, is necessary to gain further insight in possible causal factors for work stress and burnout. It is recommended to extend the longitudinal research to include engagement and positive aspects; much more insight can be gained about the interaction of engagement and burnout, while the long-term influence of positive working resources can be assessed. Methodologically, it is not unwarranted to pay more attention to the specific handling of missing values in such research. To just ignore the occurrence of missing values, which is often the case in longitudinal research, can lead to biased results. More sophisticated strategies, one of which is outlined in chapter 3, does not necessarily undo such bias; obviously, it is impossible to conjure absent data back into existence. However, besides being less vulnerable to biases, these elaborated strategies can help to give more insight into the effects of the missing data.

In the above, attention is given to burnout and engagement of dentists in relation to the well-being of that same dentist. Tentatively, at least two other outcome measures that result from either burned out, or engaged dentists can be considered: patient care and productivity. Patient care, or quality of the dental work, seems an obvious point of venture. It is not unimaginable that adverse working conditions can have a detrimental effect on patient dental care – while the presence of positive working aspects might increase quality of care. Future studies should take this issue into consideration. From an economical point of view, productivity might be another interesting aspect to consider. Seeing the ever-increasing shortage of dentists in the Netherlands, a higher productivity (i.e., more patients treated) per dentist would not be

unwelcome. The notion of the 'happy – productive worker' (i.e., a happy worker is a productive worker) has been subject of debate. Although results of studies on its causality are not unambiguous (Jex, 1998; Ledford, 1999), some evidence indicates that such a relation indeed exists (Cotton, Dollard & De Jonge, 2002; Wright & Staw, 1999a, 1999b). However, this evidence points to a *trait-based* disposition of happiness; employees in these studies are either happy or not and tend to stay that way. Translated to the situation of dentists, it is to be expected that engaged dentists are more productive than those who are not. Interestingly, the job resource factor that was found to be most important in explaining levels of engagement, was 'Pride / Idealism'. This factor (see chapter 8) consists of items such as "Feeling of being of importance", "Being proud of dentistry", and "Being a good caregiver". These aspects can also be seen as being intrinsically present, and therefore it is a relatively useless factor for trying to make the dentist happier (or more engaged). The only practical consequence associated with this finding is one that is politically incorrect, and lies in the arena of selection (as also pointed out by Ledford, 1999, p.27): "…[educational facilities] might select the happy candidates and avoid grumpy ones to improve the average level of productivity." Of course, it remains doubtful whether such implementation is desirable[25].

Conclusion

Inasmuch as "burnout threatens", as Gorter (2000, p.177) concluded, this threat should not be ignored in case of the dental practitioner. This thesis has shown that high levels of emotional exhaustion can be indicative of a pending burnout, especially when combined with feelings of incapability. Nevertheless, this thesis also provides in handles to counter the threat of burnout. By providing clear and understandable individual feedback directly to the dentist, the awareness of the potential problematic state of affairs is increased, and preventive action (preferably on the dentist's own initiative) is encouraged. The Stress Thermometer is an ideal instrument to provide

[25] Even so, it is unwise to underestimate the possible positive effects on *teacher* burnout in dental schools!

such feedback. In addition, with all the attention given to the negative aspects of dental work, the many benefits that are certainly present in providing dental care tend to be overshadowed. Now, it would make sense to turn our attention to the more positive aspects of dental work. In doing so, hopefully a balance can be found between the prevention of the burned out dentist at the one hand, and the promotion of the engaged dentist at the other. Perhaps this thesis can convince researchers and policymakers to try and accomplish such a balance.

SAMENVATTING (SUMMARY IN DUTCH)

Burnout en bevlogenheid in de tandheelkunde

Achtergrond

Dit proefschrift gaat over de werkbeleving van tandartsen. Daarbij komen niet alleen de negatieve kanten van deze werkbeleving aan de orde (zoals werkstress en burnout), maar ook de positieve (te weten werkbronnen en bevlogenheid). Het beschreven onderzoek is een vervolg op het onderzoek dat eerder door Gorter (2000) is uitgevoerd. In zijn onderzoek heeft Gorter het vóórkomen en niveau van burnout bij Nederlandse tandartsen vastgelegd. Ook onderzocht hij de effectiviteit van een speciaal voor tandartsen ontwikkeld preventieprogramma. Movir, een grote arbeidsongeschiktheidsverzekeraar voor o.m. tandartsen, bekostigde het onderzoek en besloot ook een aanvullend project financieel te ondersteunen. In dit project moest de aandacht in het bijzonder gericht worden op hoe burnout in deze beroepsgroep voorkómen kan worden.

Sinds het onderzoek van Gorter is er wereldwijd steeds meer wetenschappelijke aandacht gekomen voor burnout. De meest gebruikte vragenlijst daarbij is de Maslach Burnout Inventory (MBI), die in Nederland bekend staat als de Utrechtse Burnout Schaal (UBOS). In eerste instantie was deze vragenlijst bedoeld voor de beroepen waarin met mensen werd gewerkt (de zorg, het onderwijs, publieke stelsel). Met de toenemende populariteit van het begrip burnout is er tegenwoordig voor vele beroepsgroepen een aangepaste versie van de MBI ontwikkeld (maar ook voor bijvoorbeeld studenten is een versie ontwikkeld). In al deze versies wordt echter vastgehouden aan de oorspronkelijke driedimensionale definitie van burnout. Volgens deze definitie wordt burnout gedefinieerd door een sterk gevoel van *emotionele uitputting*, de neiging een negatieve, cynische houding te ontwikkelen ten opzichte

van het werk (dit wordt *depersonalisatie* genoemd), en verminderde gevoelens van *persoonlijke bekwaamheid.*

Naast de aanhoudende populariteit van het fenomeen burnout, is er een relatief nieuwe ontwikkeling gaande om ook de vermeende tegenpool van burnout nader te onderzoeken: bevlogenheid in het werk. Waar in het traditionele onderzoek de aandacht onevenredig werd gericht op de negatieve werkervaring (bijvoorbeeld werkstress en burnout), wordt binnen deze nieuwe ontwikkeling een meer constructieve houding aangenomen. Daarbij wordt er vanuit gegaan dat een gezonde werksituatie niet alleen ontstaat door de afwezigheid van negatieve factoren, maar dat de aanwezigheid van positieve factoren een gezonde werksituatie ook daadwerkelijk kan versterken. Aangezien Gorter in zijn onderzoek al vond dat, in vergelijking met norm scores, het niveau van burnout bij de Nederlandse tandarts relatief gunstig was, was het een logische stap om deze nieuwe onderzoekslijn ook bij tandartsen door te trekken.

Doelstellingen

In hoofdstukken 2 t/m 8 komen diverse onderwerpen aan bod, variërend van replicatie van eerder onderzoek, tot de beschrijving en evaluatie van nieuwe instrumenten en concepten. Drie (enigszins overlappende) doelstellingen kunnen daarbij onderscheiden worden. De eerste doelstelling van dit proefschrift is het verder onderzoeken van het vóórkomen en de ontwikkeling van burnout bij Nederlandse tandartsen (zie hoofdstukken 2 en 3). De tweede doelstelling is het nader ingaan op burnoutpreventie en –interventie (hoofdstukken 4, 5, en 6). De derde doelstelling is het huidige onderzoek naar werkstress en burnout uit te breiden met positieve aspecten: bevlogenheid bij de Nederlandse tandarts, en de door tandartsen ervaren werkbronnen (hoofdstukken 7 en 8). Door vroege signalen die op een mogelijke burnout wijzen te identificeren, maar ook door een sterker beeld te krijgen van de plezierige aspecten die zonder meer aanwezig zijn in de tandheelkundige praktijk, wordt verwacht dat dit proefschrift een bijdrage kan leveren aan het verbeteren van de werkomstandigheden van de tandarts-algemeen practicus.

Resultaten

In hoofdstuk 2 wordt een herhalingsonderzoek beschreven van een studie naar de houdbaarheid van de MBI (of UBOS). Voor dit onderzoek zijn twee onafhankelijke, representatieve steekproeven getrokken onder werkende tandartsen in Nederland. Het blijkt dat de drie-factor structuur van de burnout vragenlijst duidelijk naar voren komt, overeenkomstig met de resultaten uit eerder onderzoek. Aldus is eens te meer vastgesteld dat de MBI goed toepasbaar is binnen een tandheelkundige context. Ook zijn de resultaten vergeleken met de uitkomsten binnen vergelijkbare beroepsgroepen (huisartsen en fysiotherapeuten). In vergelijking met de normen in de handleiding blijkt zowel bij huisartsen, fysiotherapeuten en tandartsen bijzonder sterke samenhang te bestaan tussen emotionele uitputting en depersonalisatie. Een mogelijke verklaring hiervoor is het solistische karakter van deze beroepen. Een ander aspect dat in hoofdstuk 2 wordt behandeld is na te gaan welk chronologisch verloop tussen de drie burnout componenten bestaat. Kennis over dit verloop helpt om in een vroeg stadium signalen te herkennen die samenhangen met een ontwikkelende burnout. De in de literatuur voorgestelde chronologische modellen zijn daartoe met elkaar vergeleken, gebruik makend van Structural Equation Modelling (SEM). Daarbij is een voorkeur gevonden voor het model emotionele uitputting → depersonalisatie → persoonlijke bekwaamheid.

In hoofdstuk 3 worden de analyses over de chronologische volgorde van de burnout componenten uit hoofdstuk 2 herhaald maar dit keer binnen een longitudinale opzet. Daarbij is één en dezelfde groep tandartsen twee maal onderzocht, met een tussentijd van 3 jaar. Deze werkwijze is bij uitstek geschikt om causale verbanden aan te tonen, en is uniek binnen een tandheelkundige context. Net als in hoofdstuk 2 zijn verschillende modellen vergeleken. De resultaten geven aan dat het model emotionele uitputting → depersonalisatie → persoonlijke bekwaamheid goed past, in overeenstemming met de resultaten uit hoofdstuk 2. Geconcludeerd wordt dat vooral emotionele uitputting gezien moet worden als een vroege waarschuwing voor burnout. Daarnaast geven de resultaten aan dat het raadzaam is ook de mate waarin de tandarts zichzelf nog persoonlijk bekwaam acht niet uit het oog te verliezen.

Sekseverschillen worden wel eens aangegrepen om verschillen in burnoutniveau te verklaren. In hoofdstuk 4 worden sekseverschillen bij tandartsen nader beschouwd, en worden bovendien bepaalde achterliggende factoren onderzocht. Mannelijke tandartsen blijken gemiddeld meer werkuren te maken en meer patiënten te behandelen. Ook bleek dat vrouwen eerder gaan minderen in het werk, of er helemaal mee op te houden, wat naar voren kwam in de gemiddeld lagere leeftijd van vrouwen. Gevonden werd dat mannen een hoger niveau van depersonalisatie vertoonden dan vrouwen, wat overeen kwam met eerdere gegevens. De belangrijkste uitkomst van het in hoofdstuk 4 beschreven onderzoek is echter dat dit laatste verschil verdwijnt zodra gecontroleerd wordt voor het aantal werkuren en leeftijd. Dit resultaat geeft aan dat praktische verschillen een grote invloed kunnen hebben op de verschillen in burnout tussen mannen en vrouwen. Indien men vanuit preventief oogpunt risicogroepen wil identificeren, kan dit derhalve beter gebaseerd worden op het aantal werkuren of op leeftijd.

In eerder onderzoek werd gevonden dat een speciaal voor tandartsen ontwikkeld preventieprogramma een positief effect had op het niveau van burnout in vergelijking met een controlegroep die niet aan het programma deelnam. In hoofdstuk 5 wordt een vervolgonderzoek beschreven, waarin is nagegaan in hoeverre deze effecten na 1 jaar nog aanwezig waren. Het positieve effect bleek verdwenen: de deelnemers aan het programma lieten op lange termijn een terugval zien naar niveau van vóór het preventieprogramma. Opvallender waren de resultaten binnen de controlegroep: de tandartsen die zelf preventieve actie hadden ondernomen op basis van feedback over de persoonlijke burnout-score, gaven na een jaar een duidelijke verbetering in burnout niveau te zien. Bij tandartsen die geen gebruik hadden gemaakt van de feedback werd weinig of geen vooruitgang gevonden.

In hoofdstuk 5 is het belang van persoonlijke feedback aangetoond. Dit heeft geleid tot de ontwikkeling van een eenvoudig te gebruiken instrument om tandartsen persoonlijke feedback te geven over werkstress en burnout: de 'Stressthermometer'. In hoofdstuk 6 wordt de ontwikkeling en opzet van dit internetgebonden instrument beschreven en worden de eerste resultaten geëvalueerd. In Appendix 1 is een schematisch overzicht te vinden van de Stressthermometer zelf. Gedurende een

evaluatieperiode van vijf maanden maakte 12% van de mogelijke respondenten gebruik van de Stressthermometer. De beschrijvende karakteristieken van deze groep bleken representatief voor de Nederlandse tandarts, wat de conclusie rechtvaardigt dat de Stressthermometer inderdaad toegankelijk is voor de doelgroep. Daarmee is dit instrument doeltreffend om tandartsen op gevoelige werkgerelateerde aspecten te wijzen, die anders lastig onder de aandacht te brengen zijn.

In hoofdstuk 7 wordt de samenhang tussen burnout en zijn conceptuele tegenhanger, bevlogenheid, onderzocht bij tandartsen. De voorgestelde drie-factor structuur van de Utrechtse Bevlogenheids Schaal (Utrecht Work Engagement Scale – UWES), bestaande uit de componenten vitaliteit, toewijding, en absorptie, werd ook bij tandartsen gevonden. Bevlogenheid bleek negatief samen te hangen met burnout, zoals verwacht. Vervolgens zijn verschillende modellen van de samenhang tussen burnout en bevlogenheid vergeleken. Op grond van de theorie kon verwacht worden dat burnout en bevlogenheid elk uit drie componenten zou bestaan. Gevonden werd echter dat het best passende model bestond uit een 'kern' van burnout (bestaande uit emotionele uitputting en depersonalisatie) en een uitgebreid bevlogenheidconcept (bestaande uit persoonlijke bekwaamheid en de drie UWES componenten). Dit resultaat komt wel overeen met eerdere gevonden resultaten, waarin het 'afwijkend' gedrag van de component persoonlijke bekwaamheid wordt beschreven.

In hoofdstuk 8 is de ontwikkeling en evaluatie beschreven van een instrument om de werkbronnen in het tandheelkundige werk te onderzoeken. Binnen deze *Dentists' Experienced Job Resources Scale* (DEJRS) blijken acht factoren te onderscheiden: (1) hulpverlenende kwaliteiten; (2) het eigen werk in de mond; (3) (lange termijn) resultaten bij patiënt; (4) ambachtelijke aspecten; (5) professionele contacten; (6) eigen ondernemerschap; (7) patiëntenzorg en (8) materiële voordelen. De psychometrische kwaliteiten van de DEJRS waren erg goed. Alle factoren gaven een positieve samenhang te zien met algemene tevredenheid met het werk (job satisfaction). De DEJRS kan daarom gezien worden als een waardevolle en betrouwbare manier om specifieke werkbronnen bij tandartsen te meten.

Discussie

In hoofdstuk 9 worden de resultaten van de verschillende hoofdstukken samengevat en bediscussieerd. Hieronder volgen de belangrijkste discussiepunten en de bijbehorende conclusies.

Onderzoek naar werkstress en burnout onder tandartsen blijft van groot belang. Hoewel het gemiddelde niveau van emotionele uitputting, depersonalisatie en persoonlijke bekwaamheid bij tandartsen ongeveer stabiel blijft, is er een duidelijke toename van het percentage tandartsen dat een verhoogd risico loopt op burnout; van 11.3% in 1997, tot 14.1% en 15.8% in respectievelijk 2000 en 2001.

Er bestaat een discrepantie tussen de wetenschappelijke definitie van burnout (zoals gemeten met de MBI of UBOS), en de manier waarop een 'burnout' zich in de praktijk manifesteert. Zo komt uit de literatuur naar voren dat de bij een burnout behorende (fysieke) klachten sterk uiteen kunnen lopen. Opvallend is dat aanvullend onderzoek bij tandartsen uitwijst dat de gemelde klachten overwegend ergonomisch van aard zijn. Misschien zijn binnen andere beroepsgroepen ook dergelijke patronen terug te vinden.

Burnout wordt gedefinieerd als het resultaat van chronische, *werkgerelateerde* stress, en vindt zijn oorsprong binnen de context van het 'mensenwerk', werk waarin met patiënten of cliënten wordt gewerkt. Binnen deze context is goed te beargumenteren waarom burnout, zoals gemeten met de UBOS, kan worden onderscheiden van vergelijkbare aspecten, zoals chronische vermoeidheid, depressie en werkstress. Zo is een depressie contextvrij en kan het gezien worden als een meer gegeneraliseerd fenomeen in vergelijking met burnout. Er bestaat een zekere overeenkomst met emotionele uitputting, maar depersonalisatie en persoonlijke bekwaamheid zijn specifieke burnout-aspecten.

Hoe moet burnout gezien worden in relatie tot bevlogenheid? De resultaten uit hoofdstuk 7 geven aan dat burnout en bevlogenheid onderscheidbaar zijn, maar negatief gerelateerd. Ook bleek dat persoonlijke bekwaamheid, zoals geoperationaliseerd in de UBOS, beter bij bevlogenheid 'past' dan bij burnout. Om na te gaan of dit veroorzaakt zou kunnen zijn door de afwijkende verwoording van deze UBOS-meetschaal (positief verwoorde items in tegenstelling tot de negatief

verwoorde items in de overige schalen), is een aanvullend onderzoek uitgevoerd waaruit naar voren komt dat de positieve verwoording inderdaad van invloed is op de resultaten.

Wat heeft dit onderzoek bijgedragen op het gebied van preventie en interventie? Het is duidelijk geworden dat het niet verstandig is om sekseverschillen als criterium te nemen om burnout risicogroepen te onderscheiden. Sekseverschillen zijn mogelijk een afspiegeling van de verschillende werkindeling van mannen en vrouwen.

Wel is duidelijk geworden dat persoonlijke feedback over het niveau van burnout een positieve invloed kan hebben. De Stressthermometer is een praktisch en bruikbaar instrument gebleken voor het geven van persoonlijke feedback. Wel moet onthouden worden dat de feedback uit de stressthermometer slechts één van de informatiebronnen is die de tandarts ter beschikking staan; ook de opmerkingen van vrienden en familie, en eigen gevoelens moeten bijdragen aan de eindconclusie dat interventie nodig is. Een tweede, hiermee samenhangend punt betreft de vraag of uit de drie UBOS-scores (emotionele uitputting, depersonalisatie en persoonlijke bekwaamheid) wel één eindconclusie getrokken mag worden. In de opzet van de stressthermometer is hier rekening mee gehouden. Niet alleen worden de afzonderlijke UBOS-scores aan de tandarts getoond, maar ook de eindconclusie wordt met de nodige voorzichtigheid gebracht. Een laatste opmerking betreft het geven van directe feedback. In de stressthermometer is een verwijzing opgenomen naar gespecialiseerde hulp. In latere ontwikkelingen van de stressthermometer zou dit meer integraal in de stressthermometer kunnen worden opgenomen, om zo de drempel om hulp te zoeken verder te verlagen.

Naast het zoeken naar mogelijke manieren om de effecten van de belastende aspecten van het tandheelkundig beroep tegen te gaan, kan het nader benoemen van de positieve aspecten nut hebben in het kader van preventie. In eerder onderzoek werden deze 'werkbronnen' vaak op een vrij algemene manier geoperationaliseerd. Deze algemene aspecten zijn meestal niet direct te vertalen naar de, op veel punten afwijkende, tandheelkundige situatie. Daarom is de ontwikkeling van de DEJRS van groot belang; het geeft een concrete uitwerking van algemene begrippen binnen een

specifieke context. Juist omdat de tandarts minder mogelijkheden ervaart om van beroep te veranderen, is het van belang de positieve aspecten binnen het beroep te blijven benadrukken.

Tenslotte gaat hoofdstuk 9 in op aandachtspunten voor toekomstig onderzoek. Longitudinaal onderzoek is van groot belang om verder inzicht te krijgen in de samenhang tussen burnout en bevlogenheid. Op deze manier kunnen de lange-termijn effecten van positieve werkomstandigheden worden geanalyseerd. Daarbij is van belang de methodologische zaken, die in hoofdstuk 3 uitgebreid aan de orde zijn gekomen, niet uit het oog te verliezen. Ook worden nog twee punten aangehaald die nog niet eerder aan de orde waren gekomen; het effect van werkstress en burnout op de patiëntenzorg, en de productiviteit van de tandarts. Wellicht zijn bevlogen tandartsen productiever dan hun minder bevlogen collega's. Omdat het er op lijkt dat bevlogenheid voornamelijk wordt veroorzaakt door intrinsieke aspecten, is de praktische uitkomst hiervan wellicht niet helemaal 'politiek correct': misschien moet al bij de selectie voor de tandheelkundige opleiding een keuze worden gemaakt voor de studenten die zich zeer bevlogen tonen!

Conclusie

Het bestaan van burnout moet zeker niet onderschat worden binnen de tandheelkundige beroepsgroep: het percentage tandartsen met een verhoogd risico op burnout is de afgelopen jaren duidelijk toegenomen. Deze ontwikkeling vraagt om blijvende aandacht en maatregelen in preventieve sfeer.

Het onderzoek in dit proefschrift biedt handvatten om de 'burnout dreiging' tegen te gaan. Tandartsen moeten vooral alert zijn op verhoogde niveaus van emotionele uitputting, zeker wanneer dit gepaard gaat met verlaagde gevoelens van persoonlijke bekwaamheid. Hiervoor is het noodzakelijk dat zij zich tijdig bewust worden van het eventuele risico dat ze lopen. De Stressthermometer biedt hiervoor uitstekende mogelijkheden; het is laagdrempelig en anoniem, en het laat expliciet op elke burnoutcomponent de score zien in relatie tot de scores van collega's. Deze persoonlijke feedback kan aan de tandarts duidelijk maken dat er reden is om veranderingen in (de omgang met) het werk aan te brengen. Bovendien is gevonden

dat tandartsen die daadwerkelijk zelf actie ondernemen, een duidelijke verbetering in burnout-niveau laten zien, ook op langere termijn. Dit maakt het aannemelijk dat het van belang is de Stressthermometer blijvend toegankelijk te houden voor de tandarts-algemeen practicus.

In het verleden is veel aandacht besteed aan de negatieve aspecten in het tandheelkundig werk. Vanuit preventief oogpunt is het belangrijk ervoor te waken dat daarmee de positieve aspecten worden overschaduwd. Het verdient daarom aanbeveling deze positieve aspecten in onderzoek en beleid meer op de voorgrond te plaatsen. Op deze manier wordt een balans gevonden tussen het tegengaan van burnout enerzijds, en het versterken van bevlogenheid anderzijds.

References

AMERICAN PSYCHIATRIC ASSOCIATION (1994). *Diagnostic and statistical manual of mental disorders, 4th edition*. Washington, DC: American Psychiatric Press.

BAKKER, AB, DEMEROUTI, E & SCHAUFELI, WB (2002). Validation of the Maslach Burnout Inventory - general survey: An Internet study. *Anxiety, Stress and Coping, 15*, 245-260.

BAKKER, AB, SCHAUFELI, WB, DEMEROUTI, E, JANSSEN, PPM, VAN DER HULST, R & BROUWER, J (2000a). Using equity theory to examine the difference between burnout and depression. *Anxiety, Stress and Coping, 13*, 247-268.

BAKKER, AB, SCHAUFELI, WB, SIXMA, HJ & BOSVELD, W (2001). Burnout contagion among general practitioners. *Journal of Social and Clinical Psychology, 20*(1), 82-98.

BAKKER, AB, SCHAUFELI, WB, SIXMA, HJ, BOSVELD, W & VAN DIERENDONCK, D (2000b). Patient demands, lack of reciprocity, and burnout: A five-year longitudinal study among general practitioners. *Journal of Organizational Behavior, 21*, 425-441.

BARON, J & SIEPMAN, M (1999). Techniques for creating and using Web questionnaires in research and teaching. In BIRNBAUM, MH (Ed.), *Psychological experiments on the Internet* (pp. 235-266). San Diego, CA: Academic Press.

BENTLER, PM (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246.

BEST, SJ, KRUEGER, B, HUBBARD, C & SMITH, A (2001). An assessment of the generalizability of Internet surveys. *Social Science Computer Review, 19*(2), 131-145.

BLINKHORN, AS (1992). Stress and the dental team: a qualitative investigation of the causes of stress in general dental practice. *Dental Update, 19*(9), 385-387.

BOUMAN, AM, TE BRAKE, JHM & HOOGSTRATEN, J (2002). Significant effects due to rephrasing the Maslach Burnout Inventory's personal accomplishment items. *Psychological Reports, 91*, 825-826.

BRENNINKMEIJER, V (2002). *A drug called comparison. The pains and gains of social comparison among individuals suffering from burnout* (Academic thesis). Rijksuniversiteit van Groningen, Groningen.

BRENNINKMEIJER, V & VAN YPEREN, NW (1999). Diagnostiek van burnout met de Utrechtse Burnout Schaal. *Nederlands Tijdschrift voor de Psychologie, 54*, 105-108.

BROUWERS, A (2000). *Teacher burnout and self-efficacy: An interpersonal approach* (Academic thesis). Open Universiteit Nederland, Heerlen, The Netherlands.

BURISCH, M (1993). In search of theory: Some ruminations on the nature and etiology of burnout. In SCHAUFELI, WB, MASLACH, C & MAREK, T (Eds.), *Professional Burnout. Recent developments in theory and research* (pp. 75-94). Washington, DC: Taylor and Francis.

BURKE, RJ & GREENGLASS, ER (1995). A longitudinal examination of the cherniss model of psychological burnout. *Social Science and Medicine, 40*(10), 1357-1363.

CHAPKO, MK, BERGNER, M, BEACH, B, GREEN, K, MILGROM, P & SKALABRIN, N (1986). Development of a measure of job satisfaction for dentists and dental auxiliaries. *Community Dentistry and Oral Epidemiology, 14*(2), 76-79.

CHERNISS, C (1995). *Beyond burnout*. New York: Routledge.

CLEVELAND, JN, STOCKDALE, M & MURPHY, KR (2000). *Women and men in organizations. Sex and gender issues at work.* Mahwah, New Jersey: Lawrence Erlbaum Associates.

COLLEGE VOOR ZORGVERZEKERINGEN (2001). *Tandheelkundige gezondheidszorg in Nederland*. Amstelveen, The Netherlands: CVZ.

COLLINS, LM, SCHAFER, JL & KAM, C (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods, 6*, 330-351.

COOPER, CL, MALLINGER, M & KAHN, R (1978). Identifying sources of stress among dentists. *Journal of Occupational Psychology, 20*(8), 549-553.

CORCORAN, KJ & BRYCE, AK (1983). Intervention in the experience of burnout: Effects of skill development. *Journal of Social Service Research, 7*, 71-79.

CORDES, CL & DOUGHERTY, TW (1993). A review and integration of research on job burnout. *Academy of management review, 18*(4), 621-656.

CORDES, CL, DOUGHERTY, TW & BLUM, M (1997). Patterns of burnout among managers and professionals: A comparison of models. *Journal of Organizational Behavior, 18*, 685-701.

COTTON, SJ, DOLLARD, MF & DE JONGE, J (2002). Stress and student job design: Satisfaction, well-being, and performance in university students. *International Journal of Stress Management, 9*(3), 147-162.

DE PUTTER, C & DEN DEKKER, J (2002). Dental Health Care. In VAN ROOIJ, E, DROYAN KODNER, L, RIJSEMUS, T & SCHRIJVERS, G (Eds.), *Health and health care in The Netherlands: A critical self-assessment of Dutch experts in medical and health sciences* (pp. 123-131). Maarssen, The Netherlands: Elsevier gezondheidszorg.

DE VRIES, T (2001). *Burnout bij fysiotherapeuten met de verbijzondering manuele therapie. (Burnout among physio-manual-therapists)* (Academic thesis). University of Amsterdam, Amsterdam, The Netherlands.

DE VRIES, T & HOOGSTRATEN, J (1999). Burnout bij fysio-manueel therapeuten in Nederland (Burnout among physiotherapists in The Netherlands). *Nederlands Tijdschrift voor de Fysiotherapie, 4*, 90-95.

DEARY, IJ, WATSON, R & HOGSTON, R (2003). A longitudinal cohort study of burnout and attrition in nursing students. *43*(1), 71-81.

DIENER, E (1999). Introduction to the special section on the structure of emotion. *Journal of Personality and Social Psychology, 76*(5), 803-804.

DILLMAN, DA (1978). *Mail and telephone surveys. The total design method.* New York: John Wiley & Sons.

DOCPOTTER'SPATHFINDING_BOOKS_&_USEFUL_INFORMATION (2003, 09/16/03). *ARE YOU BURNING OUT?* Website: http://www.docpotter.com/Burningout.html

DOLAN, CV (1994). Factor analysis of variables with 2, 3, 5 and 7 response categories: A comparison of categorical variable estimators using simulated data. *British Journal of Mathematical and Statistical Psychology, 47*, 309-326.

EAGLY, AH & CHAIKEN, S (1993). *The psychology of attitudes*. Ft. Worth, TX: Harcourt Brace Jovanovich College Publishers.

ECCLES, JD & M., P (1967). The health of dentists: A survey in South Wales 1965/1966. *British Dental Journal, 123*, 379-387.

ENDERS, CK (2001). A primer on Maximum Likelihood algorithms available for use with missing data. *Structural Equation Modeling, 8*(1), 128-141.

ENZMANN, D, SCHAUFELI, WB, JANSSEN, P & ROZEMAN, A (1998). Dimensionality and validity of the burnout measure. *Journal of Occupational and Organizational Psychology, 71*, 331-351.

EVANS, BK & FISCHER, DG (1993). The nature of burnout: A study of the three-factor model of burnout in human service and non-human service samples. *Journal of Occupational and Organizational Psychology, 66*, 29-38.

FLOOD PAGE, CM & SLACK, GL (1968). A contended profession? A survey of Old Londener dentists: 1968. *British Dental Journal, 127*, 220-225.

FREEMAN, R, MAIN, JR & BURKE, FJ (1995). Occupational stress and dentistry: theory and practice. Part II. Assessment and control. *British Dental Journal, 178*(6), 218-222.

FREUDENBERGER, HJ (1974). Staff Burn-Out. *Journal of Social Issues, 30*(1), 159-165.

GELLERSEN, H-W & SCHMIDT, A (2002). Look who's visiting: supporting visitor awareness in the web. *International Journal of Human-Computer Studies, 56*, 25-46.

GLASS, DC & MCKNIGHT, JD (1996). Perceived control, depressive symptomatology, and professional burnout: A review of the evidence. *Psychology and Health, 11*, 23-48.

GOLEMBIEWSKI, RT & MUNZENRIDER, RF (1988). *Phases of burnout*. New York: Praeger.

GORTER, RC (2000). *Burnout among dentists: Identification and prevention* (Academic thesis). University of Amsterdam, Amsterdam, The Netherlands.

GORTER, RC, ALBRECHT, G, HOOGSTRATEN, J & EIJKMAN, MAJ (1998). Work place characteristics, work stress and burnout among Dutch dentists. *European Journal of Oral Sciences, 106*, 999-1005.

GORTER, RC, ALBRECHT, G, HOOGSTRATEN, J & EIJKMAN, MAJ (1999a). Factorial validity of the Maslach Burnout Inventory - Dutch Version (MBI-NL) among dentists. *Journal of Organizational Behavior, 20*, 209-217.

GORTER, RC, ALBRECHT, G, HOOGSTRATEN, J & EIJKMAN, MAJ (1999b). Measuring work stress among Dutch dentists. *International Dental Journal, 49*(3), 144-152.

GORTER, RC, ALBRECHT, G, HOOGSTRATEN, J & EIJKMAN, MAJ (1999c). Professional burnout among Dutch dentists. *Community Dentistry and Oral Epidemiology, 27*, 109-116.

GORTER, RC, EIJKMAN, MAJ & HOOGSTRATEN, J (2001). A career counseling program for dentists: effects on burnout. *Patient Education and Counseling, 43*, 23-30.

GRYSKIEWICZ, N & BUTTNER, EH (1992). Testing the robustness of the progressive phase model for a sample of entrepreneurs. *Educational and Psychological Measurement, 52*, 747-751.

HAYS, WL (1981). *Statistics. Third edition*. New York: CBS College publishing.

HOBFOLL, SE & FREEDY, J (1993). Conservation of resources: A general stress theory applied to burnout. In SCHAUFELI, WB, MASLACH, C & MAREK, T (Eds.), *Professional*

burnout. Recent developments in theory and research (pp. 237-250). London, UK: Taylor & Francis.

HOLLAND, BS & DIPONZIO COPENHAVER, M (1988). Improved Bonferroni-type multiple testing procedures. *Psychological Bulletin, 104*, 145-149.

HOOGSTRATEN, J (2004). *De machteloze onderzoeker. Voetangels en klemmen van sociaal-wetenschappelijk onderzoek. (Pitfalls in human research)*. Meppel: Boom.

HOUKES, I, JANSSEN, PPM, DE JONGE, J & BAKKER, AB (2003). Personality, work characteristics, and employee well-being: A longitudinal analysis of additive and moderating effects. *Journal of Occupational Health Psychology, 8*(1), 20-38.

HOWARD, JH, CUNNINGHAM, DA, RECHNITZER, PA & GOODE, RC (1976). Stress in the job and career of a dentist. *Journal of the American Dental Association, 93*(3), 630-636.

HU, L & BENTLER, PM (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.

HUMPHRIS, G (1998). A review of burnout in dentists. *Dental Update, 25*, 392-396.

HYDE, JS (1991). *Half the human experience. The psychology of women. Fourth edition.* Lexington, Massachusetts D.C.: Heath and company.

JEX, SM (1998). *Stress and job performance: Theory, research, and implications for managerial practice*. Thousand Oaks, CA: Sage.

JOOSTEN, J & DROP, MJ (1987). De betrouwbaarheid en vergelijkbaarheid van drie versies van de VOEG. *Gezondheid en Samenleving, 8*, 251-265.

JÖRESKOG, KG & SÖRBOM, D (1996). *Lisrel: User's reference guide*. Chicago, IL: Scientific Software International.

JÖRESKOG, KG & SÖRBOM, D (2001). LISREL 8.54 (Version Windows). Chicago, IL: Scientific Software International, Inc.

JÖRESKOG, KG & SÖRBOM, D (2002). *LISREL 8: Structural Equation Modeling with the SIMPLIS command language.* Chicago, IL: Scientific Software International.

JUDD, CM, SMITH, ER & KIDDER, LH (1991). *Research methods in social relations*. Forth Worth, TX: Holt, Rhinehart & Winston, Inc.

KROMREY, JD & DICKINSON, WB (1995). The use of an overall F test to control for type I error rates in factorial analysis of variance: limitations and better strategies. *Journal of Applied Behavioral Psychology, 31*, 51-64.

LANGE, A, VAN DE VEN, JP, SCHRIEKEN, B & SMIT, M (2004). 'Interapy' Burn-out: Prävention und behandlung von Burn-out über das Internet. *Verhaltenstherapie, 14*, 190-199.

LAZARUS, RC (1995). Theoretical perspectives in occupational stress research. In CRANDALL, R & PERREWÉ, PL (Eds.), *Occupational Stress: A handbook* (pp. 3-14). Washington, DC: Taylor & Francis.

LEDFORD, GE (1999). Comment: Happiness and productivity revisited. *Journal of Organizational Behavior, 20*, 25-30.

LEE, RT & ASHFORTH, BE (1996). A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology, 81*(2), 123-133.

LEITER, MP (1989). Conceptual implications of two models of burnout: A response to Golembiewski. *Group & Organizational Studies, 14*, 15-22.

LEITER, MP (1993). Burnout as a developmental process: Consideration of models. In SCHAUFELI, WB, MASLACH, C & MAREK, T (Eds.), *Professional burnout: Recent developments in theory and research* (pp. 237-250). Washington, DC: Taylor & Francis.

LITTLE, RJA (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*(404), 1198-1202.

LITTLE, RJA & SCHENKER, N (1995). Missing data. In ARMINGER, G, CLOGG, CC & SOBEL, ME (Eds.), *Handbook of statistical modeling for the social and behavioral sciences* (pp. 39-75). New York: Plenum Press.

MARSH, HW, BALLA, JR & MCDONALD, RP (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin, 103*, 391-410.

MASLACH, C & JACKSON, SE (1981). The measurement of experienced burnout. *Journal of Occupational Behaviour, 2*, 99-113.

MASLACH, C, JACKSON, SE & LEITER, MP (1996). *MBI manual, 3rd edition*. Palo Alto, CA: Consulting psychologists press.

MASLACH, C & LEITER, MP (1997). *The truth about burnout: How organizations cause personal stress and what to do about it*. San Francisco, CA: Jossey-Bass.

MASLACH, C, SCHAUFELI, WB & LEITER, MP (2001). Job Burnout. *Annual Review of Psychology, 52*, 397-422.

MCDONALD, B & BOUD, D (2003). The impact of self-assessment on achievement: the effects of self-assessment training on performance in external examinations. *Assessment in Education, 10*(2), 209-220.

MCKNIGHT, DJ & GLASS, DC (1995). Perceptions of control, burnout, and depressive symptomatology: A replication and extension. *Journal of Consulting and Clinical Psychology, 63*(3), 490-494.

MEREDITH, W (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika, 58*, 525-543.

MEREDITH, W & HORN, J (2001). The role of factorial invariance in modeling growth and change. In COLLINS, LM (Ed.), *New methods for the analysis of change. Decade of behavior* (pp. 203-240). Washington, DC: American psychological association.

MOTTAZ, C (1986). Gender differences in work satisfaction, work-related rewards and values, and the determinants of work satisfaction. *Human Relations, 39*(4), 359-378.

MURTOMAA, H, HAAVIO-MANNILA, E & KANDOLIN, I (1990). Burnout and its causes in Finnish dentists. *Community Dentistry and Oral Epidemiology, 18*, 208-212.

MUSCH, J & REIPS, U (1999). A brief history of web experimenting. In BIRNBAUM, MH (Ed.), *Psychological experiments on the Internet* (pp. 61-87). San Diego, CA: Academic Press.

NETHERLANDS STATISTICS (2002). *Meer mannen, jongeren en hoger opgeleiden op het Internet. (More males, young persons and higher educated people on the Internet).* Netherlands Statistiscs (PB02-132).

NEWTON, JT, THOROGOOD, N & GIBBONS, DE (2000). A study of the career development of male and female dental practitioners. *British Dental Journal, 188*, 90-94.

NIELSEN//NETRATINGS (2003, 09/01/03). *Nederlandse Internetpopulatie is nu 9.2 miljoen* Website: http://www.nielsennetratings.com/pr/pr_030225_netherlands.pdf

OSBORNE, D & CROUCHER, R (1994). Levels of burnout in general dental practitioners in the south-east of England. *British Dental Journal, 177*, 372-377.

O'SHEA, RM, CORAH, NL & AYER, WA (1984). Sources of dentists' stress. *Journal of the American Dental Association, 109*(1), 48-51.

PERLMAN, B & HARTMAN, E (1982). Burnout: Summary and future research. *Human Relations, 35*(4), 283-305.

PROHEALTH_ONLINE (2003, 16/09/03). *Burnout Test* Website: http://www.prohealth.com/articles/burnout.htm

RABINER, DJ, SHUGARS, DA & HAYS, RD (1994). A short-form measure of dentists' job satisfaction. *Evaluation and Program Planning, 17*, 271-275.

RADA, RE & JOHNSON-LEONG, C (2004). Stress, burnout, anxiety and depression among dentists. *Journal of the American Dental Association, 135*, 788-794.

ROXBURGH, S (1996). Gender differences in work and well-being: Effects of exposure and vulnerability. *Journal of Health and Social Behavior, 37*, 265-277.

RUBIN, DB (1976). Inference and missing data. *Biometrica, 63*, 581-592.

SAVICKI, V & COOLEY, EJ (1994). Burnout in Child protective service workers: a longitudinal study. *Journal of Organizational Behavior, 15*, 655-666.

SCHAFER, JL (1997). *Analysis of incomplete multivariate data*. London: Chapman and Hall.

SCHAFER, JL (1999). NORM: Multiple imputation of incomplete multivariate data under a normal model, version 2. Software for windows 95/98/NT.

SCHAFER, JL (2001). Multiple imputation in multivariate problems when imputation and analysis models differ. In BETHLEHEM, J & VAN BUUREN, S (Eds.), *Missing values: Proceedings of a symposium on incomplete data* (pp. 1-22). Utrecht: VVS-OR.

SCHAFER, JL & GRAHAM, JW (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7*(2), 147-177.

SCHAFER, JL & OLSEN, MK (1998). Multiple imputation for multivariate missing-data problems: A data analyst's perspective. *Multivariate behavioural research, 33*, 545-571.

SCHAUFELI, WB (1995). The evaluation of a burnout workshop for community nurses. *Journal of Health and Human Services Administration, 7*, 71-79.

SCHAUFELI, WB & BAKKER, AB (2003a). Burnout en bevlogenheid (Burnout and engagement). In SCHAUFELI, WB, BAKKER, AB & JONGE, JD (Eds.), *De psychologie van arbeid en gezondheid (The psychology of work and health)* (pp. 295-309). Houten/Mechelen: Boh Stafleu van Loghum.

SCHAUFELI, WB & BAKKER, AB (2003b). *UBES. Utrechtse Bevlogenheidsschaal. Voorlopige handleiding, versie 1 (UBES, preliminary test manual, version 1)*. Utrecht: Utrecht University, Section Psychology of Work, Health and Organisation.

SCHAUFELI, WB & BAKKER, AB (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior, 25*, 293-315.

SCHAUFELI, WB & ENZMANN, D (1998). *The burnout companion to study and practice: A critical analysis*. London, UK: Taylor & Francis.

SCHAUFELI, WB, MÁRTINEZ, IM, MARQUES PINTO, A, SALANOVA, M & BAKKER, AB (2002a). Burnout and engagement in university students. A cross-national study. *Journal of Cross-Cultural Psychology, 33*(5), 464-481.

SCHAUFELI, WB, MASLACH, C & MAREK, T (1993). *Professional burnout: Recent developments in theory and research*. Washington, DC: Taylor & Francis.

SCHAUFELI, WB, SALANOVA, M, GONZÁLEZ-ROMÁ, V & BAKKER, AB (2002b). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3*, 71-92.

SCHAUFELI, WB & VAN DIERENDONCK, D (1993). The construct validity of two burnout measures. *Journal of Organizational Behavior, 14*, 631-647.

SCHAUFELI, WB & VAN DIERENDONCK, D (1995). *Maslach burnout inventory, Dutch version (MBI-NL). Provisional manual*. Utrecht, The Netherlands: Utrecht University, Research School Psychology & Health.

SCHAUFELI, WB & VAN DIERENDONCK, D (2000). *Utrechtse burnout schaal. Handleiding (Dutch MBI-NL manual)*. Lisse, The Netherlands: Swets & Zeitlinger B.V.

SCHMIDT, WM (1997). World-wide web survey research: Benefits, potential problems, and solutions. *Behavior Research Methods, Instruments, & Computers, 29*(2), 274-279.

SCHUTTE, N, TOPPINEN, S, KALIMO, R & SCHAUFELI, WB (2000). The factorial validity of the Maslach Burnout Inventory-general survey (MBI-GS) across occupational groups and nations. *Journal of Occupational and Organizational Psychology, 73*, 53-66.

SELIGMAN, MEP & CSIKSZENTMIHALYI, M (2000). Positive psychology: An introduction. *American Psychologist, 55*(1), 5-14.

SHAVELSON, RJ (1981). *Statistical reasoning for the behavioral sciences*. Boston, Massachusetts: Allyn and Bacon.

SHUGARS, DA, DIMATTEO, MR, HAYS, RD, CRETIN, S & JOHNSON, JD (1990). Professional satisfaction among California general dentists. *Journal of Dental Education, 54*(11), 661-669.

SIEGEL, S & CASTELLAN, NJ (1988). *Nonparametric statistics for the behavioral sciences.* Singapore: McGraw-Hill.

SMITS, N (2003). *Academic specialization choices and academic achievement: Prediction and incomplete data* (Academic thesis). University of Amsterdam, Amsterdam.

SMITS, N, MELLENBERGH, GJ & VORST, HCM (2002). Alternative missing data techniques to grade point average: Imputing unavailable grades. *Journal of Educational Measurement, 39*, 187-206.

STANTON, JM (1998). An empirical assessment of data collection using the Internet. *Personnel Psychology, 51*, 709-725.

STANTON, JM & ROGELBERG, SG (2001). Using Internet/Intranet web pages to collect organizational research data. *Organizational Research Methods, 4*(3), 200-217.

STEVENS, J (1996). *Applied multivariate statistics for the social sciences.* Mahwah, New Jersey: Lawrence Erlbaum Associates.

STUURGROEP TOEKOMSTSCENARIO'S TANDHEELKUNDE (1993). *Toekomstscenario's tandheelkunde. Een verkenning van de periode 1990-2020. Scenariorapport.* Rijswijk, The Netherlands: Bohn Stafleu Van Loghum.

TE BRAKE, JHM, BLOEMENDAL, E & HOOGSTRATEN, J (2003). Gender differences in burnout among Dutch dentists. *Community Dentistry and Oral Epidemiology, 31*(5), 321-327.

TE BRAKE, JHM, EIJKMAN, MAJ, HOOGSTRATEN, J & GORTER, RC (in press). Dentists' self assessment of burnout: An Internet feedback tool. *International Dental Journal.*

TE BRAKE, JHM, GORTER, RC, HOOGSTRATEN, J & EIJKMAN, MAJ (2001). Burnout intervention among Dutch dentists: Long term effects. *European Journal of Oral Sciences, 109*, 380-387.

VAN DER PLOEG, E & KLEBER, RJ (2003). Acute and chronic job stressors among ambulance personnel: predictors of health symptoms. *Occupational and Environmental Medicine, 60 Suppl 1*, i40-46.

VAN DIERENDONCK, D (1997). *Balancing the give and take. An equity approach to burnout* (Academic thesis). Universiteit Utrecht, Utrecht.

VAN DIERENDONCK, D, GROENEWEGEN, PP & SIXMA, HJ (1992). *Opgebrand: Een inventariserend onderzoek naar gevoelens van motivatie en demotivatie bij huisartsen.[Burned out; A study on feelings of motivation and demotivation among physicians]*. Utrecht, The Netherlands: NIVEL.

VAN DIERENDONCK, D, SCHAUFELI, WB & BUUNK, BP (1998). The evaluation of an individual burnout intervention program: The role of inequity and social support. *Journal of Applied Psychology, 83*(3), 392-407.

VAN DIERENDONCK, D, SCHAUFELI, WB & BUUNK, BP (2001). Towards a process model of burnout: Results from a secondary analysis. *European Journal of Work and Organizational Psychology, 10*(1), 41-52.

VAN SONSBEEK, JLA (1990). *De VOEG: klaaglijst of lijst met gezondheidsklachten? Netherlands statistics publication M37.* The Hague, The Netherlands: SDU.

WORLD HEALTH ORGANIZATION (1992). *The ICD-10 classification of mental and behavioral disorders: Clinical description and diagnostic guidelines*. Geneva, Switzerland: WHO.

WRIGHT, TA & STAW, BM (1999a). Affect and favorable work outcomes: two longitudinal tests of the happy-productive worker thesis. *Journal of Organizational Behavior, 20*, 1-23.

WRIGHT, TA & STAW, BM (1999b). Reply: Further Thoughts on the happy-productive worker. *Journal of Organizational Behavior, 20*, 31-34.

ZAPF, D, DORMANN, C & FRESE, M (1996). Longitudinal studies in organizational stress research: A review of the literature with reference to methodological issues. *Journal of Occupational Health Psychology, 1*(2), 145-169.

List of (pre)publications and submitted abstracts

Resulting from the studies described in this thesis, the following publications have appeared, or will appear shortly.

Journal articles, published

BRAKE, JHM TE, EIJKMAN, MAJ, HOOGSTRATEN, J & GORTER, RC (In press). Dentists' self assessment of burnout: An Internet feedback tool. *International Dental Journal.*

BRAKE, JHM TE, BLOEMENDAL, E & HOOGSTRATEN, J (2003). Gender differences in burnout among Dutch dentists. *Community Dentistry and Oral Epidemiology, 31*(5), 321-327.

BRAKE, JHM TE, GORTER, RC, HOOGSTRATEN, J & EIJKMAN, MAJ (2001). Burnout intervention among Dutch dentists: Long term effects. *European Journal of Oral Sciences, 109*, 380-387.

BOUMAN, AM, TE BRAKE, JHM & HOOGSTRATEN, J (2002). Significant effects due to rephrasing the Maslach Burnout Inventory's personal accomplishment items. *Psychological Reports*, *91*, 825-826.

GORTER, R.C., EIJKMAN, M.A.J., BRAKE, J.H.M. TE (2001) Werkdruk en gezondheid bij tandartsen. *Nederlands Tijdschrift voor de Tandheelkunde, 108*:54-58 (2001)

Abstracts

BRAKE, JHM TE, BLOEMENDAL, E & HOOGSTRATEN, J (2002) Gender differences in burnout among dentists: associated factors. *IADR,* Abstract no.1309

BRAKE, JHM TE, GORTER, RC, HOOGSTRATEN, J & EIJKMAN, MAJ (2002) Measuring the long-term effects of a burnout intervention program among Dutch dentists using an alternative assessment. *IADR,* Abstract no.1311

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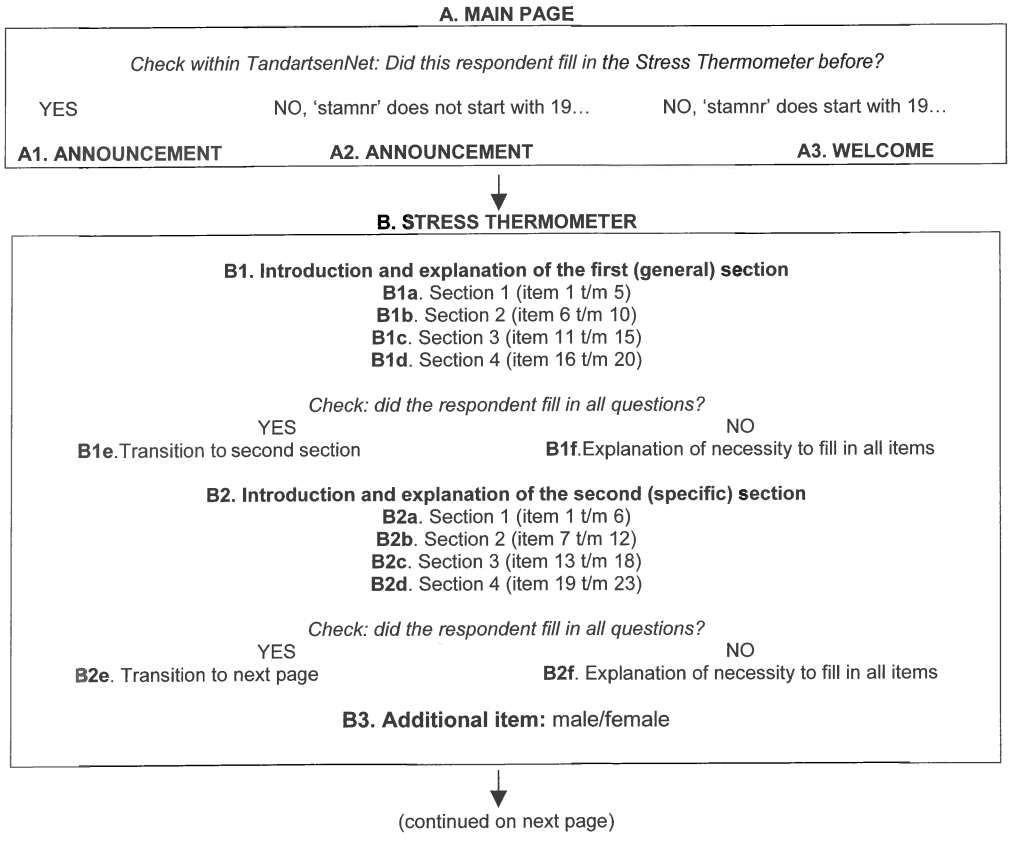
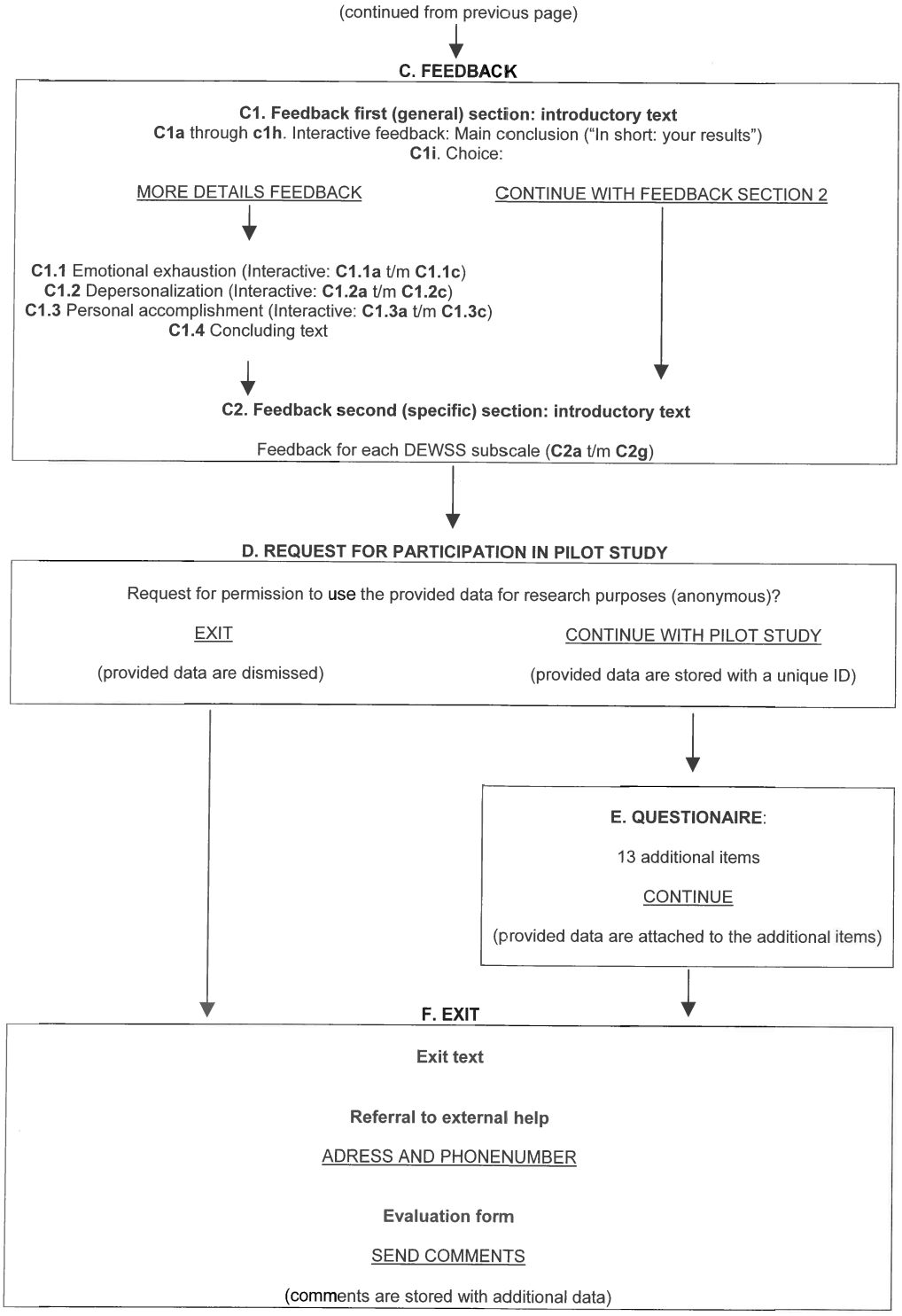
Appendices

Appendix 1a. Schematic overview of the Stress Thermometer

The schematic overview shown below represents the Stress Thermometer and the combined pilot study. See Chapter 6 for more details on the backgrounds and design of the Stress Thermometer and the pilot study. Boldface codes (A–G) refer to specific textual and graphical segments used in the feedback web pages. More details on these segments are available from the author.




(continued from previous page)
C. FEEDBACK
C1. Feedback first (general) section: introductory text
C1a through c1h. Interactive feedback: Main conclusion ("In short: your results")
C1i. Choice:
MORE DETAILS FEEDBACK
CONTINUE WITH FEEDBACK SECTION 2
C1.1 Emotional exhaustion (Interactive: C1.1a t/m C1.1c)
C1.2 Depersonalization (Interactive: C1.2a t/m C1.2c)
C1.3 Personal accomplishment (Interactive: C1.3a t/m C1.3c)
C1.4 Concluding text
C2. Feedback second (specific) section: introductory text
Feedback for each DEWSS subscale (C2a t/m C2g)
D. REQUEST FOR PARTICIPATION IN PILOT STUDY
Request for permission to use the provided data for research purposes (anonymous)?
EXIT
(provided data are dismissed)
CONTINUE WITH PILOT STUDY
(provided data are stored with a unique ID)
E. QUESTIONAIRE:
13 additional items
CONTINUE
(provided data are attached to the additional items)
F. EXIT
Exit text
Referral to external help
ADRESS AND PHONENUMBER
Evaluation form
SEND COMMENTS
(comments are stored with additional data)

Appendix 1b. Norm tables used for the Stress Thermometer

Presented below are the cut-off scores used in the Stress Thermometer (see chapter 6). Table 1 shows the ranges used to classify the EE, D, and PA scores, used in the first (general) section of the Stress Thermometer. Table 2 shows the cut-off scores for the DEWSS scores, used in the second (specific) section of the Stress Thermometer.

TABLE 1. CUT-OFF SCORES FOR EE, D, AND PA

	EE	D male	D female	PA
(very) low	≤.99	≤.59	≤.59	≤ 3.85
average	1.00–2.24	.60–1.79	.60–1.39	3.86–4.99
(very) high	≥2.25	≥1.80	≥1.40	≥5.00

TABLE 2. CUT-OFF SCORES FOR THE DEWSS SUBSCALES

	1.WP	2.WC	3.CP	4.FA	5.PC	6.PRI	7.TW	TOT
very low	1.00	1.00	1.00	1.00-1.20	1.00	1.00	1.00	1.00-1.53
low	1.01-2.00	1.01-1.75	1.01-1.20	1.21-2.20	1.01-2.00	1.01-1.50	1.01-2.00	1.54-2.04
normal	2.01-3.50	1.76-2.75	1.21-2.60	2.21-3.60	2.01-3.67	1.51-3.00	2.01-3.00	2.05-2.91
high	3.51-4.50	2.76-3.75	2.61-3.80	3.61-4.71	3.68-4.67	3.01-4.00	3.01-4.00	2.92-3.57
very high	4.51-5.00	3.76-5.00	3.81-5.00	4.72-5.00	4.68-5.00	4.01-5.00	4.01-5.00	3.58-5.00