

Burnout contagion among intensive care nurses

Arnold B. Bakker PhD

Professor, Department of Social and Organizational Psychology, Utrecht University, Utrecht, The Netherlands

Pascale M. Le Blanc PhD

Assistant Professor, Department of Social and Organizational Psychology, Utrecht University, Utrecht, The Netherlands

Wilmar B. Schaufeli PhD

Professor, Department of Social and Organizational Psychology, Utrecht University, Utrecht, The Netherlands

Accepted for publication 28 January 2005

Correspondence:

Arnold B. Bakker,
Department of Social and
Organizational Psychology,
Utrecht University,
PO Box 80.140,
Utrecht 3508 TC,
The Netherlands.
E-mail: a.bakker@fss.uu.nl

BAKKER A.B., LE BLANC P.M. & SCHAUFELI W.B. (2005) *Journal of Advanced Nursing* 51(3), 276–287

Burnout contagion among intensive care nurses

Aim. This paper reports a study investigating whether burnout is contagious.

Background. Burnout has been recognized as a problem in intensive care units for a long time. Previous research has focused primarily on its organizational antecedents, such as excessive workload or high patient care demands, time pressure and intensive use of sophisticated technology. The present study took a totally different perspective by hypothesizing that – in intensive care units – burnout is communicated from one nurse to another.

Methods. A questionnaire on work and well-being was completed by 1849 intensive care unit nurses working in one of 80 intensive care units in 12 different European countries in 1994. The results are being reported now because they formed part of a larger study that was only finally analysed recently. The questionnaire was translated from English to the language of each of these countries, and then back-translated to English. Respondents indicated the prevalence of burnout among their colleagues, and completed scales to assess working conditions and job burnout.

Results. Analysis of variance indicated that the between-unit variance on a measure of perceived burnout complaints among colleagues was statistically significant and substantially larger than the within-unit variance. This implies that there is considerable agreement (consensus) within intensive care units regarding the prevalence of burnout. In addition, the results of multilevel analyses showed that burnout complaints among colleagues in intensive care units made a statistically significant and unique contribution to explaining variance in individual nurses' and whole units' experiences of burnout, i.e. emotional exhaustion, depersonalization and reduced personal accomplishment. Moreover, for both emotional exhaustion and depersonalization, perceived burnout complaints among colleagues was the most important predictor of burnout at the individual and unit levels, even after controlling for the impact of well-known organizational stressors as conceptualized in the demand-control model.

Conclusion. Burnout is contagious: it may cross over from one nurse to another.

Keywords: burnout, emotional contagion, intensive care, nurse, nursing theory

Introduction

Traditionally, intensive care nurses have heavy workloads and extensive responsibilities, but only limited authority. They must care for unstable patients, carry out procedures accurately and react to extremely urgent matters (Erlen & Sereika 1997), although their decision latitude is often insufficient to cope effectively with these demands (Sawatzky 1996). Such working conditions form the breeding ground for job stress. According to the demand-control model (Karasek 1979), jobs that combine high demands with low control evoke psychological and physical distress ('high strain' jobs). Such working conditions eventually deplete nurses' emotional resources and may initiate the burnout syndrome (see, for example, DeRijk *et al.* 1998, Bourbonnais *et al.* 1999).

Burnout has been defined as a specific kind of occupational stress among human service professionals, as a result of the demanding and emotionally charged relationships between caregivers and their recipients (Maslach & Jackson 1986). Feelings of emotional exhaustion are generally considered a core symptom of the burnout syndrome (Shirom 2003). In addition, two other central characteristics of burnout have been documented: the development of negative, cynical attitudes towards the recipients of one's service or care (depersonalization), and the tendency to believe that one is no longer effective in working with patients (reduced personal accomplishment) (Maslach & Jackson 1986).

Emotional contagion

Emotional contagion has been defined as 'The tendency to automatically mimic and synchronize facial expressions, vocalizations, postures, and movements with those of another person and, consequently, to converge emotionally' (Hatfield *et al.* 1994, p. 5). The emphasis in this definition is on non-conscious emotional contagion. Research has indeed shown that, in conversations, people 'automatically' mimic the facial expressions, voices, postures and behaviours of others (Bavelas *et al.* 1987, Bernieri *et al.* 1988), and that people's conscious experience may be shaped by such facial feedback (e.g. Laird 1984).

There is, however, a second way in which people may 'catch' another's emotions. Contagion may also occur via a conscious cognitive process by 'tuning in' to the emotions of others. This will be the case when individuals try to imagine how they would feel in the position of another, and, as a consequence, experience the same feelings. Thus, the realization that another person is happy or sad may trigger memories of the times we have felt that way, and these

reveries may spark similar emotions (Hsee *et al.* 1990). The professional attitude of intensive care unit (ICU) nurses that is characterized by empathic concern is likely to foster such a process of consciously 'tuning in' to others' emotions.

Regardless of *why* such contagion might occur, researchers from a wide range of disciplines have described phenomena that suggest that emotional contagion *does* exist (see Hatfield *et al.* 1994, McIntosh *et al.* 1994, for overviews). Hsee *et al.* (1990) and Uchino *et al.* (1991) documented convincing evidence for emotional contagion using controlled laboratory studies. In these experiments, college students were asked to observe video tapes of another (fictitious) participant relating an emotional experience. They were then asked what emotions they felt as they watched the person describe the happiest and saddest event in their life. The results of these experiments show that participants 'catch' the emotions of the stimulus person. In each of the experiments, both participants' self-reports, and judges' ratings of participants' facial expressions of emotions showed that they were happier when they were watching a stimulus person expressing happy emotions than when they were watching them expressing sad feelings.

Contagious depression

It seems reasonable to assume that the mechanisms involved in burnout contagion processes are similar to those involved in more fundamental emotional contagion processes. Moreover, there is also evidence for contagious depression, and depression is a syndrome that is related to burnout, most notably the emotional exhaustion dimension (Glass *et al.* 1993). More specifically, depression accounts for approximately 20% of the variance in emotional exhaustion, the core symptom of burnout.

In a classic study of contagious depression, Howes *et al.* (1985) assessed first year college students twice using the Beck Depression Inventory, namely at the start of the semester and 3 months later. The students were randomly assigned to a room with a mildly depressed roommate or with a non-depressed roommate. Those who were assigned to a room with a depressed roommate became increasingly depressed over time. Joiner (1994) reported similar evidence for contagious depression in an independent roommate study. Importantly, this latter study showed that the contagion effect persisted when baseline levels of roommate depression and roommate negative life events were controlled for.

Burnout contagion

Research on the aetiology of burnout has shown that the syndrome may manifest itself in behavioural as well as social

symptoms (see Schaufeli & Enzmann 1998, for an overview), meaning that burnout symptoms may be noticed by others. Consequently, it is not surprising that several researchers have argued that burnout may be contagious (e.g. Cherniss 1980, Edelwich & Brodsky 1980), and evidence in support of the burnout contagion hypothesis is gradually accumulating. In one of the first studies on burnout contagion, Groenestijn *et al.* (1992) gave empirical evidence for burnout contagion among nurses. As predicted, they found that nurses with a strong need for social comparison information (in contrast with their counterparts who did not exhibit such a need) reported higher levels of burnout when they perceived more burnout complaints among their colleagues. The reason for this is presumably that nurses who have a particularly high need for social comparison are influenced by the attitudes and behaviours of their colleagues. In line with this finding, Buunk and Schaufeli (1993) have suggested that colleagues may act as role models, whose symptoms are imitated through a process of emotional contagion.

In a study among teachers, Bakker and Schaufeli (2000) found that employees who frequently talked with their burned out colleagues about problematic students had the highest probability of catching the negative attitudes expressed by their colleagues. In repeatedly trying to understand the problems their colleagues were facing, teachers presumably had to tune in to the negative attitudes expressed by their colleagues (about themselves as well as about students). This creates a condition under which central or systematic processing (instead of peripheral or heuristic processing) of information is likely to occur (Petty & Cacioppo 1986). The result is negative attitude change, particularly when the burned out colleague (the 'source') has evidence or strong arguments to bolster their frustration and uncaring attitudes (see also Bakker *et al.* 2001).

A recent study by Bakker *et al.* (2003a) among a sample of 490 employees of a large banking and insurance company confirmed the phenomenon of burnout contagion in work teams. They showed that burnout at the team level is related to individual team members' burnout scores, both directly and indirectly through its relationship with individual members' job demands, job control and perceived social support. In addition, indirect evidence for the contention that burnout contagion exists within work teams was found 20 years ago in a study by Rountree (1984), who investigated 186 task groups in 23 local settings of organizations. He found that 87.5% of employees with the highest scores on burnout worked in task groups in which at least 50% of the staff were in a similar advanced burnout phase. Low scoring, less burned out employees showed a similar but less marked

tendency to cluster. Rountree concluded that '...the affinity of work groups for extreme scores seems substantial' (p. 245). Thus, individuals with very high or very low burnout scores can often be found within one task group, suggesting the possibility that task group members 'infect' each other with the burnout-'virus'.

Burnout contagion among ICU nurses

It is important to note that Rountree's (1984) and Bakker *et al.*'s (2003a) finding that individuals in a very high or very low burnout phase can often be found within one work group or team is not necessarily the result of a contagion process. It is conceivable that burnout is prevalent within one task group, because of the fact that the workload in that particular group is extremely high (third variable explanation). In addition, although the findings by Groenestijn *et al.* (1992) suggest that burnout contagion exists, the design of this study leaves room for alternative explanations as well (e.g. projection).

Burnout has been recognized as a problem in ICUs for a long time (Lewandowski & Kositsky 1983). Previous research has focused primarily on its organizational antecedents, such as excessive workload (e.g. Tummers *et al.* 2002), time pressure and task complexity (DeRijk *et al.* 1998), intensive use of sophisticated technology (Schaufeli *et al.* 1995), low decision authority (Tummers *et al.* 2002), and confrontation with patient deaths and severe illness (Mallett *et al.* 1991). In the study reported here we took a totally different perspective by hypothesizing that – in ICUs – burnout is *communicated* from one nurse to another. This hypothesis will be tested in a large sample of 1849 nurses from 80 different ICUs.

The study

Aim

In the present study, we tested the burnout contagion hypothesis, by examining the unique contribution of burnout complaints among colleagues in predicting individual nurses' burnout and burnout in ICUs, after controlling for the impact of well-known indicators of organizational stress, namely the components of Karasek's (1979) job demand-control model. More specifically, we examined the impact of burnout complaints among colleagues on individual nurses' and ICU teams' feelings of emotional exhaustion, depersonalization, and reduced personal accomplishment, after partialling out the impact of high job demands and low job control. To our knowledge, no research has tested the

burnout contagion hypothesis so comprehensively among ICU nurses.

Design

The present study was part of the EURICUS-I project, the first European study examining the impact of organization and management on the effectiveness and efficiency of ICUs. EURICUS-I was carried out under the auspices of the Foundation for Research on Intensive Care in Europe (FRICE; see Reis Miranda *et al.* 1997) and was funded by the BIOMED-program of the European Union only after a very careful assessment of its feasibility and ethical issues.

Participants

The participating ICUs were recruited from the network of FRICE by the project team.

Data collection

In each ICU, the head nurse was responsible for informing nursing staff about the aim and procedures of the project and for collecting patients' clinical management data as well as self-report questionnaires. The study was approved by the ethics committees of the participating hospitals. Informed consent was waived. In October 1994, a questionnaire on work and well-being was distributed among 3000 ICU nurses working in one of 80 ICUs in 12 different European countries. The questionnaire was translated from English to the language of each of these countries, and then back-translated to English by bi-lingual researchers and experts in the field of intensive care nursing. A total of 2090 nurses returned the questionnaire (response rate = 74%). After listwise deletion of cases with missing values, the final number of respondents was 1849, working in one of 80 ICUs. This sample included 1470 women (79.5%) and 369 men (20%); for 10 nurses (0.5%) information on gender was missing. Age ranged from 20 to 64 years, with a mean age of 32.5 years ($SD = 6.9$). On average, these nurses had 6.5 years ($SD = 5.6$) of ICU experience, and had been working in the present ICU for 5.6 years ($SD = 5.2$). Eighty-three per cent of the nurses had a full-time appointment. Table 1 shows the distribution of the 1849 respondents over the 12 different countries.

Measures

Our questionnaire was made up of measures which have been extensively used and validated in similar studies. In particular, the burnout measure is one of the most frequently employed

Table 1 Distribution of participants over the 12 European countries and Catalonia ($N = 1849$)

Country	Number (%) of respondents
Belgium	161 (8.7)
Denmark	143 (7.7)
Finland	157 (8.5)
France	115 (6.2)
Germany	91 (4.9)
Italy	119 (6.4)
Luxemburg	24 (1.3)
The Netherlands	210 (11.4)
Poland	108 (5.8)
Portugal	110 (5.9)
Catalonia	167 (9.0)
Rest of Spain	232 (12.5)
United Kingdom	212 (11.5)
Total	1849 (100)

instruments in organizational psychology (Schaufeli & Enzmann 1998) and several articles on its cross-national validity have already been published (e.g. Enzmann *et al.* 1995, Schutte *et al.* 2000).

Job demands were assessed with a scale derived from a Dutch version (Furda 1995) of Karasek's (1985) Job Content questionnaire (see also Van Veldhoven *et al.* 2002). The scale includes four items that refer to quantitative demanding aspects of the job (e.g. time pressure, working hard). Because of a low factor-loading, one of the items of the job demands scale had to be removed. A sample item is: 'My work requires working very hard' (1 = never, 4 = always). The job demands scale had a moderate internal consistency: Cronbach's α was 0.61.

Objective workload in the ICU. In addition to subjectively experienced job demands, nurses' objective workload was assessed with the Nine Equivalent of nursing Manpower use Score (NEMS; Reis Miranda *et al.* 1996). This records ICU nurses' objective workload by monitoring nine different nursing activities (e.g. basic monitoring, intravenous medication, endotracheal intubation) for each patient separately. Each of the nursing activities has a different weight, corresponding to its labour intensiveness. In the present study, nursing activities for each patient were scored for 24 hours per day, during a 4-month period. Objective workload in the ICU was computed for each unit separately by adding the weighted scores for each of the nine nursing activities recorded during these 4 months.

The *decision latitude*-scale is also derived from the Dutch version (Furda 1995) of Karasek's (1985) Job Content Instrument (see also Van Veldhoven *et al.* 2002). It includes five items on *skill discretion* (i.e. the breadth of skills used by

workers in performing their job) and four items on *decision authority* (i.e. freedom of action in accomplishing the formal work task). An example is: 'My job allows me to make a lot of decisions on my own' (1 = never, 4 = always). Cronbach's α was 0.63.

Perceived burnout complaints among colleagues was assessed using Groenestijn *et al.*'s (1992) three-item scale, including 'How many of your colleagues at the ICU are 'burned out'?' (1 = none of my colleagues, 5 = most of my colleagues). The three items were combined in one index for perceived burnout complaints. This measure had a reasonable internal consistency: Cronbach's α was 0.71.

Burnout was measured using the Dutch translation of the Maslach Burnout Inventory (MBI; Maslach & Jackson 1986), consisting of three subscales: emotional exhaustion, depersonalization and personal accomplishment. *Emotional exhaustion* was measured with nine items, for example: 'I feel emotionally drained from my work'. Cronbach's α for this scale was 0.79. *Depersonalization* was measured with five items, including 'I feel I treat some of my patients as if they were impersonal objects' (Cronbach's α was 0.61). *Personal accomplishment* was measured with eight items, including 'I feel I am positively influencing other people's lives through my work' (Cronbach's α was 0.73). All items were scored on a seven-point rating scale (0 = never, 6 = every day). High levels of emotional exhaustion and depersonalization, and a low level of personal accomplishment are indicative for burnout.

Multilevel regression analyses

Multilevel regression analysis deals with research objects that are hierarchically structured, that is, when social processes are thought to operate at several levels (Hox 1995). The full multilevel regression model assumes that there is a hierarchical dataset, with one single dependent variable that is measured at the lowest level, and explanatory variables at the same and higher levels. Conceptually, the model can be viewed as a hierarchical system of regression equations. In the present study, we assumed that the scores on the three burnout dimensions reported by individual nurses depended on the ICU where they worked and on the country where they lived. Thus, our dataset had a three-level structure: individual nurses (at level 1) nest within ICUs (at level 2), and ICUs, in turn, nest within countries (at level 3). Technically speaking, we expected that the average or intra-class correlation between variables measured among nurses from the same ICU (and from the same country) would be higher than the average correlation between variables measured among nurses from different units (and different countries).

Data analysis

We performed three multilevel regression analyses with the MLn-computer program (see Woodhouse 1996), for each burnout-dimension separately. Scores on the predictor variables were standardized by computing *z*-scores, before entering them into the equations (cf. Aiken & West 1991). On the basis of the observed data, we wanted to estimate the parameters of the multilevel regression model: the regression coefficients and the variance components. The estimators currently used in multilevel analyses are maximum likelihood (ML) estimators. Maximum likelihood estimates are those parameter estimates that maximize the probability of finding the sample data that have actually been found (Hox 1995).

The ML procedure produces a statistic called the deviance, which indicates how well the model fits the data. In general, models with a lower deviance fit better than models with a higher deviance. If two models are nested, the difference of the deviances for the two models has a chi-square distribution with degrees of freedom equal to the difference in the number of parameters estimated in the two models. This can be used to perform a formal chi-square test to test whether the more general model fits significantly better than the simpler model.

The multilevel analysis starts with an intercept-only model: a model that includes no explanatory variables (Model 1). All fixed and random coefficients from the equation to be built are excluded from this model. In the next step, the total amount of variance in the dependent variable under consideration is partitioned into variance that can be accounted for at the individual level, the ICU level, and the country level (Model 2). Multilevel analysis is only allowed if Model 2 fits better to the data than Model 1. Thus, the deviance value of the second model has to be significantly lower than the deviance value of the intercept-only model. The three resulting variances are the starting-point for the following models.

In the present study, in the third step of the analysis, ICU nurses' individual scores on the four predictor-variables – job demands, decision latitude, the job demands \times decision latitude interaction term, and burnout complaints among colleagues – were entered into the equation (Model 3). The MLn-computer program estimated the amount of variance explained by these variables at the individual, ICU and country levels, and estimated the regression coefficients of the multilevel model.

In the fourth step, objective workload in the ICU (i.e. NEMS-scores), and aggregated scores on decision latitude, their cross-product interaction term, and perceived burnout complaints among colleagues were entered into the equation

(Model 4). Again, on the basis of the observed data, the computer program estimated the parameters of the multilevel model, i.e. the regression coefficients and the variance components. In the fifth and final step, this procedure was repeated with aggregated scores for the predictor variables at the country level.

Results

Descriptive statistics

The means, standard deviations and intercorrelations of all study variables are presented in Table 2. Before testing the hypotheses, we examined whether there was consensus within ICUs about the prevalence of burnout. A one-way analysis of variance was computed with 'perceived burnout complaints among colleagues' as the dependent variable. This showed that the between-group variance on this variable was significantly and substantially larger than the within-group variance ($F(79, 1769) = 8.73, P < 0.001$). This implies that there was considerable *consensus* within units about the prevalence of burnout.

Emotional exhaustion

The results of the ML-analysis with emotional exhaustion as the dependent variable are presented in Table 3. The intercept-only model that included no explanatory variables (Model 1) indicated that the total amount of variance to be explained was 100% (1.0 for standardized scores). Furthermore, the results showed that the deviance value of Model 2 was significantly lower than that of Model 1. This means that the ICU level and the country level accounted for a significant proportion of the variance in emotional exhaustion scores (ICU level: $t^2 = 9\%$; country level: $t^2 = 12\%$; individual level: $s^2 = 79\%$).

In the third step of the analysis, ICU nurses' individual scores on the four predictor-variables – job demands, decision

latitude, the job demands \times decision latitude interaction term, and burnout complaints among colleagues – were entered into the equation (Model 3). The combination of these predictor variables explained a significant amount of the variance in emotional exhaustion on each of the three hierarchical levels: 13% at the individual level, 7% at the ICU level and 5% at the country level. The analysis produced significant regression coefficients for each of the predictor variables, except for the interaction term of job demands and decision latitude.

Importantly, of the three significant predictors, perceived burnout complaints among colleagues showed the strongest relationship with feelings of emotional exhaustion. Individual perceptions of job demands and burnout complaints among colleagues were statistically significantly and positively related to emotional exhaustion. Thus, the higher the perceived job demands, and the more colleagues were perceived as burned out, the more emotionally drained the nurses were themselves. Individual perception of decision latitude was significantly negatively related to emotional exhaustion, showing that a lower degree of freedom in accomplishing the work task coincided with increased feelings of emotional exhaustion.

Finally, the difference in deviance between Model 3 and Model 4 was not statistically significant, indicating that the amount of variance in individual nurses' levels of emotional exhaustion that could be accounted for by the predictors at the ICU level was not statistically significant. Nevertheless – taken together – the results indicate that, even when controlling for the impact of well-known organizational stressors, individual nurses' perceptions of burnout complaints among colleagues had a significant and strong impact on emotional exhaustion. Most importantly, this variable explained a significant proportion of the variance in emotional exhaustion scores at the individual level and at the ICU level. This latter result provides support for our central hypothesis that burnout is contagious.

Table 2 Means, standard deviations, and intercorrelations for stressors in the intensive care unit and burnout, $N = 1849$

Variable	M	SD	1	2	3	4	5	6	7	8
1. Emotional exhaustion	3.08	0.90	–							
2. Depersonalization	2.19	0.96	0.43**	–						
3. Reduced personal accomplishment	2.56	0.91	0.08**	0.23**	–					
4. Job demands	2.68	0.52	0.40**	0.11**	0.09**	–				
5. Decision latitude	2.77	0.36	–0.03	–0.10**	–0.32**	0.15**	–			
6. Objective workload [†]	26.66	3.49	0.13	0.11	0.01	0.17	0.08	–		
7. Job demands \times decision latitude interaction term	0.15	1.03	–0.09**	–0.05	–0.04	–0.02	0.09**	0.05	–	
8. Burnout complaints among colleagues	2.46	0.79	0.39**	0.23**	0.12**	0.25**	–0.08**	–0.04	–0.05*	–

[†]Objective workload is measured at the ICU level. Therefore, all correlations with this variable are based on $N = 80$; * $P < 0.05$, ** $P < 0.01$.

Table 3 Multilevel analysis of job demands, decision latitude and burnout complaints among colleagues on emotional exhaustion ($N_{\text{country}} = 13/N_{\text{ICU}} = 80/N_{\text{individual}} = 1849$)

Model	Variance (%)	Coefficient	Deviance	df	Δ_{Dev}
Model 1					
<i>Random part</i>					
Total	1.00 (100)	–	5244.32	1	–
Model 2					
<i>Random part</i>					
s^2 individual	0.79 (79)	–	4932.29	3	312.03***
t^2 group (ICU)	0.09 (9)	–			
t^2 group (country)	0.12 (12)	–			
Model 3					
<i>Fixed part</i>					
Job demands		0.24***			
Decision latitude		–0.10***			
Job demands \times decision latitude		n.s.			
Burnout complaints among colleagues		0.33***			
<i>Random part</i>					
s^2 individual	0.66				
t^2 group (ICU)	0.02				
t^2 group (country)	0.07				
<i>Variance explained</i>					
R^2 individual	0.13 (13)		4541.90	7	390.39***
R^2 group (ICU)	0.07 (7)				
R^2 group (country)	0.05 (5)				
Model 4					
<i>Random part</i>					
s^2 individual	0.66				
t^2 group (ICU)	0.02				
t^2 group (country)	0.06				
<i>Variance explained</i>					
R^2 individual	0.13 (13)		4539.79	10	2.11
R^2 group (ICU)	0.07 (7)				
R^2 group (country)	0.06 (6)				

*** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$; n.s. = not significant (two-tailed).

ICU: intensive care unit.

Depersonalization

The results of the ML-analysis for depersonalization are shown in Table 4. As can be seen from this table, the deviance value of Model 2 is significantly lower than the deviance value of Model 1. The ICU level and the country level accounted for a small, but significant proportion of the variance in depersonalization scores (ICU level: $t^2 = 4\%$; country level: $t^2 = 1\%$; individual level: $s^2 = 95\%$). Of the four predictor-variables at the individual level, only decision latitude and perceived burnout complaints among colleagues were statistically significantly related to depersonalization (Model 3). As was the case for emotional exhaustion, this relationship was strongest for perceived burnout complaints. Individual perceptions of burnout complaints among colleagues were positively related to depersonalization, whereas

individual perceptions of decision latitude were negatively related to depersonalization. The two predictors explained a significant amount of the variance in depersonalization at two of the three hierarchical levels: 6% at the individual level, and 1% at the ICU level.

The difference in deviance between Model 3 and Model 4 was not statistically significant, indicating that the amount of variance in individual nurses' levels of depersonalization that could be accounted for by the predictors at the group (ICU) level was not statistically significant. Taken together, these results show that perceived burnout complaints among colleagues had an independent impact on ICU nurses' attitudes towards their patients at the individual and at the ICU level, even after controlling for other organizational stressors. This again supports our burnout contagion hypothesis.

Table 4 Multilevel analysis of job demands, decision latitude and burnout complaints among colleagues on depersonalization ($N_{\text{country}} = 13/$
 $N_{\text{ICU}} = 80/N_{\text{individual}} = 1849$)

Model	Variance (%)	Coefficient	Deviance	df	Δ_{Dev}
Model 1					
<i>Random part</i>					
Total	1.00 (100)	–	5249.03	1	–
Model 2					
<i>Random part</i>					
s^2 individual	0.95 (95)	–	5207.16	3	41.87***
t^2 group (ICU)	0.04 (4)	–			
t^2 group (country)	0.01 (1)	–			
Model 3					
<i>Fixed part</i>					
Job demands		n.s.			
Decision latitude		–0.10***			
Job demands \times decision latitude		n.s.			
Burnout complaints among colleagues		0.23***			
<i>Random part</i>					
s^2 individual	0.89				
t^2 group (ICU)	0.03				
t^2 group (country)	0.01				
<i>Variance explained</i>					
R^2 individual	0.06 (6)		5089.90	7	117.26***
R^2 group (ICU)	0.01 (1)				
R^2 group (country)	0.00 (0)				
Model 4					
<i>Random part</i>					
s^2 individual	0.89				
t^2 group (ICU)	0.03				
t^2 group (country)	0.01				
<i>Variance explained</i>					
R^2 individual	0.06 (6)		5088.52	10	1.38
R^2 group (ICU)	0.01 (1)				
R^2 group (country)	0.00 (0)				

*** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$; n.s. = not significant (two-tailed).

ICU: intensive care unit.

Reduced personal accomplishment

The results for this burnout-dimension are shown in Table 5. Again, the deviance value of Model 2 was significantly lower than the deviance value of Model 1. The ICU level and the country level accounted for a significant proportion of the variance in reduced personal accomplishment scores (ICU level: $t^2 = 3\%$; country level: $t^2 = 5\%$; individual level: $s^2 = 92\%$). As was the case for depersonalization, only individual perceptions of decision latitude and of burnout complaints among colleagues were statistically significantly related to feelings of reduced personal accomplishment (Model 3). However, this dependent variable showed the strongest relationship with decision latitude. Individual perceptions of decision latitude were negatively related to feelings of reduced personal accomplishment, whereas this

relationship was positive for individual perceptions of burnout complaints among colleagues.

The difference in deviance between Model 3 and Model 4 was not statistically significant, indicating that the amount of variance in individual nurses' levels of reduced personal accomplishment that could be accounted for by the four predictors at the group (ICU) level was not statistically significant. In conclusion, consistent with the results for the emotional exhaustion and depersonalization dimensions of burnout, the results provided evidence for a unique, independent impact of perceived burnout complaints among colleagues on feelings of diminished personal accomplishment. The more burnout complaints ICU nurses perceived among their colleagues, the stronger their belief that they themselves were no longer effective in working with patients and in fulfilling their job responsibilities.

Table 5 Multilevel analysis of job demands, decision latitude and burnout complaints among colleagues on reduced personal accomplishment ($N_{\text{country}} = 13/N_{\text{ICU}} = 80/N_{\text{individual}} = 1849$)

Model	Variance (%)	Coefficient	Deviance	df	Δ_{Dev}
Model 1					
<i>Random part</i>					
Total	1.00 (100)	–	5241.01	1	–
Model 2					
<i>Random part</i>					
s^2 individual	0.92 (92)	–	5142.32	3	98.69***
t^2 group (ICU)	0.03 (3)	–			
t^2 group (country)	0.05 (5)	–			
Model 3					
<i>Fixed part</i>					
Job demands		n.s.			
Decision latitude		–0.29***			
Job demands \times decision latitude		n.s.			
Burnout complaints among colleagues		0.12***			
<i>Random part</i>					
s^2 individual	0.83				
t^2 group (ICU)	0.02				
t^2 group (country)	0.03				
<i>Variance explained</i>					
R^2 individual	0.09 (9)		4946.42	7	195.90***
R^2 group (ICU)	0.01 (1)				
R^2 group (country)	0.02 (2)				
Model 4					
<i>Random part</i>					
s^2 individual	0.83				
t^2 group (ICU)	0.02				
t^2 group (country)	0.03				
<i>Variance explained</i>					
R^2 individual	0.09 (9)		4943.57	10	2.85
R^2 group (ICU)	0.01 (1)				
R^2 group (country)	0.02 (2)				

*** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$; n.s. = not significant (two-tailed).

ICU: intensive care unit.

Discussion

The central hypothesis in this study was that nurses who work in ICUs may be infected with the ‘burnout-virus’ by their colleagues. More specifically, we predicted that these nurses – who collaborate intensively – may ‘catch’ the negative feelings, cynical attitudes, or impaired job behaviours of their colleagues. The results of the present study among a large sample of almost 2000 nurses from 80 different ICUs and 12 different European countries provide evidence for this burnout contagion hypothesis. Nurses who reported the highest prevalence of burnout among their colleagues were most likely to experience high levels of burnout themselves. Moreover, perceived burnout complaints among colleagues had a positive, independent impact on each of the three burnout dimensions (i.e. emotional exhaustion, depersonal-

ization and reduced personal accomplishment), even after controlling for the impact of well-known job-stressors.

Thus, our results are in line with previous empirical findings demonstrating a unique and independent burnout contagion effect among human service professionals (Bakker & Schaufeli 2000, Bakker *et al.* 2001, 2003a). Remarkably, the burnout contagion effect was confirmed for all three components of the burnout syndrome. Moreover, for both emotional exhaustion and depersonalization, perceived burnout complaints among colleagues turned out to be the most important predictor. Therefore, although the results show that (high) job demands and (limited) decision latitude are important organizational stressors influencing burnout, they suggest that one’s colleagues’ behaviours and attitudes towards patients are even more important antecedents of the burnout syndrome in this occupational group.

This agrees with the social psychological perspective of Buunk and Schaufeli (1993), who wrote: 'Our central thesis is that burnout develops primarily in a social context, and that to understand the development and persistence of burnout, attention has to be paid to the way individuals perceive, interpret, and construct the behaviours of others at work' (pp. 52–53). Moreover, our results supplement the traditional view that the root cause of burnout lies in the demanding and emotionally charged relationships with clients as they suggest that *colleagues* also play an important role in the development of burnout.

As our study was not designed to reveal the precise processes responsible for burnout contagion, we can only speculate about the routes to contagion. One possible route is the unconscious one. That is, ICU nurses may have become emotionally exhausted because they 'automatically' mimicked the emotions and behaviours expressed by their colleagues. For example, it is conceivable that they 'caught' their colleagues' burnout symptoms unconsciously during their frequent interactions, in which they imitated each others' physical expressions of emotional exhaustion and physical fatigue.

A second possibility is that burnout contagion occurred consciously. This process may have been most prevalent, because ICU nurses frequently discussed the health status of their patients with each other, or often socialized with one another during or after work. In these situations, the attitudes and emotions of one nurse may have been transmitted to another. Further research is needed to find out how human service professionals catch their colleagues' feelings of exhaustion, diminished sense of personal accomplishment, and cynical attitudes towards the recipients of their care. Quasi-experimental studies seem best suited to revealing the precise mechanisms involved in burnout contagion processes.

A strong feature of the present study is that it rules out several alternative explanations for the positive relationship between perceived burnout complaints among colleagues and the three burnout dimensions. First, our analyses showed that there is considerable consensus regarding the prevalence of burnout within ICUs. This finding argues against possible alternative explanations for the relationship between perceived burnout complaints among colleagues and burnout, such as 'false consensus' (Ross *et al.* 1977), and cognitive dissonance explanations. Research on the false consensus phenomenon has shown that people are inclined to overestimate the prevalence of their own attitudes, emotions and behaviours. In addition, cognitive dissonance theory would predict that nurses who experience feelings of burnout will be motivated to reduce the difference between their own cognitions and emotions and those of their colleagues. Our finding that nurses who worked *within* a certain ICU agreed

with each other on the prevalence of burnout within their unit argues against these alternative explanations.

Second, the finding that burnout complaints among colleagues made a unique contribution to explaining the variance in individual nurses' burnout, after controlling for the impact of well-known indicators of organizational stress (high job demands and low job control), rules out an important 'third variable' explanation. This explanation would have been that burnout was prevalent within one unit because of the fact that, for example, the workload in that particular unit was extremely high.

Our findings showed that – in addition to perceived burnout complaints among colleagues – job demands were a significant predictor of emotional exhaustion, but not of depersonalization and personal accomplishment. In contrast, for these latter burnout dimensions, decision latitude was the only organizational stressor that made an independent contribution to explaining variance – in addition to perceived burnout complaints. These findings are consistent with Lee and Ashforth's (1996) meta-analysis and with the Job Demands-Resources model of burnout (Demerouti *et al.* 2000, 2001). According to this model, emotional exhaustion is more strongly related to job demands than to job resources, and depersonalization and personal accomplishment are more strongly related to job resources than to job demands (see also Bakker *et al.* 2003b). In addition, the present results are consistent with those of many other studies that failed to demonstrate that particularly the combination of high job demands and low job control evokes psychological and physical distress (see Van der Doef & Maes 1999, for an overview). These additional observations strengthen the validity of our findings.

Study limitations

The limitations of our study clearly must be noted. First, as the study was part of a larger project, the detailed analyses reported here could only be performed recently, whereas the data collection took place several years ago. The age of our data might give rise to concerns on the continued relevance of our findings. However, we did not focus on *mean* scores on variables (which may, of course, change over time) but rather on *relationships* between variables (which are much less likely to change over time). Therefore, the delay in publishing does not affect the relevance of the results presented as it is very unlikely that the impact of fundamental psychological processes such as emotional contagion would be different after one decade.

Second, the study was conducted within a specific group of human service professionals, namely ICU nurses, thereby

What is already known about this topic

- Burnout is a serious problem for nurses who work at intensive care units.
- Nurses who are exposed to high job demands and few job resources suffer particularly from burnout.

What this paper adds

- Burnout is communicated from one nurse to another, both consciously and unconsciously.
- In addition to unfavourable working conditions, the prevalence of burnout complaints among colleagues contributes to explaining variance in individual nurses' burnout levels.

limiting its generalizability. However, the results corroborate those of earlier research that has provided evidence for similar burnout contagion processes among health care professionals (Groenestijn *et al.* 1992, Bakker *et al.* 2001).

Third, it is unclear *how* burnout contagion takes place. Is it a conscious process, is it an unconscious process, or a combination of the two? Is repeated exposure to colleagues suffering from burnout necessary for burnout contagion to occur? Quasi-experimental and longitudinal studies seem best suited to answering these more fundamental questions in future research. Finally, the analyses in the current study are correlational and thus do not confirm causality.

Conclusion

Previous research has identified a variety of individual and organizational consequences of burnout, including reduced emotional and physical well-being, absenteeism, and personnel turnover. Thus, burnout has been shown to have important dysfunctional ramifications, implying substantial costs for both individuals and organizations (Cordes & Dougerthy 1993). The present study shows that burnout is not limited to individuals, but may be an important concern for whole units and organizations. Thus, the results emphasize the potential benefits of social-psychological interventions at the organizational level. Such burnout interventions could focus, for example, on leadership style, team atmosphere, and interpersonal dynamics in working teams.

Acknowledgements

This research was supported by grants from the European Community Biomed I-Program (#BMH1-CT93-1340) and

from the Dutch Organization for Scientific Research (#310014). The authors thank Tom Snijders for his advice regarding statistical analysis.

Author contributions

ABB, PMB and WBS were responsible for the study conception and design and for critical revisions of the paper. PMB and WBS performed the data collection and provided administrative support. ABB and PMB undertook the data analysis and provided statistical expertise. ABB drafted the manuscript. WBS obtained funding. ABB and WBS were supervisors.

References

- Aiken L.S. & West S.G. (1991) *Multiple Regression: Testing and Interpreting Interactions*. Sage Publications, Newbury Park, CA.
- Bakker A.B. & Schaufeli W.B. (2000) Burnout contagion processes among teachers. *Journal of Applied Social Psychology* 30, 2289–2308.
- Bakker A.B., Schaufeli W.B., Sixma H.J. & Bosveld W. (2001) Burnout contagion among general practitioners. *Journal of Social and Clinical Psychology* 20, 82–90.
- Bakker A.B., Demerouti E. & Schaufeli W.B. (2003a) The socially induced burnout model. In *Advances in Psychology Research*, Vol. 25 (Shohov S.P., ed.), Nova Science Publishers, New York, pp. 13–30.
- Bakker A.B., Demerouti E., Taris T., Schaufeli W.B. & Schreurs P. (2003b) A multi-group analysis of the Job Demands – Resources model in four home care organizations. *International Journal of Stress Management* 10, 16–38.
- Bavelas J.B., Black A., Lemery C.R. & Mullett J. (1987) Motor mimicry as primitive empathy. In *Empathy and Its Development* (Eisenberg N. & Strayer J., eds), Cambridge University Press, New York, pp. 317–338.
- Bernieri F.J., Reznick J.S. & Rosenthal R. (1988) Synchrony, pseudosynchrony, and dissynchrony: measuring the entrainment process in mother–infant interactions. *Journal of Personality and Social Psychology* 54, 1242–1253.
- Bourbonnais R., Comeau M. & Vézina M. (1999) Job strain and evolution of mental health among nurses. *Journal of Occupational Health Psychology* 4, 95–107.
- Buunk A.P. & Schaufeli W.B. (1993) Burnout: a perspective from social comparison theory. In *Professional Burnout: Recent Developments in Theory and Research* (Schaufeli W.B., Maslach C. & Marek T., eds), Taylor & Francis, New York, pp. 53–69.
- Cherniss C. (1980) *Professional Burnout in Human Service Organizations*. Praeger, New York.
- Cordes C.L. & Dougerthy T.W. (1993) A review and integration of research on job burnout. *Academy of Management Review* 18, 621–656.
- Demerouti E., Bakker A.B., Nachreiner F. & Schaufeli W.B. (2000) A model of burnout and life satisfaction among nurses. *Journal of Advanced Nursing* 32, 454–464.

- Demerouti E., Bakker A.B., Nachreiner F. & Schaufeli W.B. (2001) The Job Demands – Resources model of burnout. *Journal of Applied Psychology* 86, 499–512.
- DeRijk A.E., LeBlanc P.M., Schaufeli W.B. & DeJonge J. (1998) Active coping and need for control as moderators of the job demand-control model: effects on burnout. *Journal of Occupational and Organizational Psychology* 71, 1–18.
- Edelwich J. & Brodsky A. (1980) *Burnout: Stages of Disillusionment in the Helping Professions*. Human Sciences Press, New York.
- Enzmann D., Schaufeli W.B. & Girault N. (1995) The validity of the Maslach Burnout Inventory in three national samples. In *Health Workers and AIDS: Research, Interventions and Current Issues* (Bennett L., Miller D. & Ross M., eds), Harwood, Chur, Switzerland, pp. 131–150.
- Erlen J.A. & Sereika S.M. (1997) Critical care nurses, ethical decision-making and stress. *Journal of Advanced Nursing* 26, 953–961.
- Furda J. (1995) Werk, persoon en welzijn: Een toets van het JD-C model [Work, personality, and well-being: a test of the JD-C model]. Unpublished Doctoral Dissertation, Utrecht University, Utrecht, The Netherlands.
- Glass D.C., McKnight D. & Valdimarsdottir H. (1993) Depression, burnout, and perceptions of control in hospital nurses. *Journal of Consulting and Clinical Psychology* 61, 147–155.
- Groenestijn E., Buunk B.P. & Schaufeli W.B. (1992) Het besmettingsgevaar bij burnout: De rol van sociale vergelijkingsprocessen [The danger of burnout contagion: the role of social comparison processes]. In *Sociale psychologie & beïnvloeding van intermenselijke en gezondheidsproblemen* (Meertens R.W., Buunk A.P., van Lange P.A.M. & Verplanken B., eds), VUGA, The Hague, The Netherlands, pp. 88–103.
- Hatfield E., Cacioppo J.T. & Rapson R.L. (1994) *Emotional Contagion*. Cambridge University Press, New York.
- Howes M.J., Hokanson J.E. & Lowenstein D.A. (1985) Induction of depressive affect after prolonged exposure to a mildly depressed individual. *Journal of Personality and Social Psychology* 49, 1110–1113.
- Hox J.J. (1995) *Applied Multilevel Analysis*. TT-publikaties, Amsterdam.
- Hsee C.K., Hatfield E., Carlson J.G. & Chemtob C. (1990) The effect of power on susceptibility to emotional contagion. *Cognition and Emotion* 4, 327–340.
- Joiner T.F. Jr (1994) Contagious depression: existence, specificity to depressive symptoms, and the role of reassurance seeking. *Journal of Personality and Social Psychology* 67, 287–296.
- Karasek R.A. (1979) Job demands, job decision latitude, and mental strain: implications for job design. *Administrative Science Quarterly* 24, 285–308.
- Karasek R.A. (1985) *Job Content Questionnaire*. University of Southern California, Los Angeles, CA.
- Laird J.D. (1984) The real role of facial response in the experience of emotion: a reply to Tourangeau and Ellsworth, and others. *Journal of Personality and Social Psychology* 47, 909–917.
- Lee R.T. & Ashforth B.E. (1996) A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology* 81, 123–133.
- Lewandowski L.A. & Kositsky A.M. (1983) Research priorities for critical care nursing: a study by the American Association of Critical Care Nurses. *Heart and Lung* 12, 35–44.
- Mallett K., Price J.H., Jurs S.G. & Slenker S. (1991) Relationships among burnout, death anxiety, and social support in hospice and critical care nurses. *Psychological Reports* 68, 1347–1359.
- Maslach C. & Jackson S.E. (1986) *MBI: Maslach Burnout Inventory: Manual Research Edition*. University of California, Consulting Psychologists Press, Palo Alto, CA.
- McIntosh D.N., Druckman D. & Zajonc R.B. (1994) Socially induced affect. In *Learning, Remembering, Believing: Enhancing Human Performance* (Druckman D. & Bjork R.A., eds), National Academy Press, Washington, DC, pp. 251–276.
- Petty R.E. & Cacioppo J.T. (1986) The elaboration likelihood model of persuasion. In *Advances in Experimental Social Psychology*, Vol. 19 (Berkowitz L., ed.), Academic Press, Orlando, FL, pp. 124–205.
- Reis Miranda D., Iapichino G. & Moreno R. (1996) NEMS: Nine Equivalents of Nursing Manpower use score. *Intensive Care Medicine* 22, 296.
- Reis Miranda D., Ryan D.W., Schaufeli W.B. & Fidler V. (eds) (1997) *Organisation and Management of Intensive Care: A Prospective Study in 12 European Countries*. Springer, Berlin.
- Ross L., Green D. & House P. (1977) The ‘false consensus effect’: an egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology* 13, 279–301.
- Rountree B.H. (1984) Psychological burnout in task groups. *Journal of Health and Human Resources Administration* 7, 235–248.
- Sawatzky J.V. (1996) Stress in critical care nurses: actual and perceived. *Heart and Lung* 25, 409–417.
- Schaufeli W.B. & Enzmann D. (1998) *The Burnout Companion to Study and Practice: a Critical Analysis*. Taylor & Francis, London.
- Schaufeli W.B., Keijsers G.J. & Reis Miranda D. (1995) Burnout, technology use, and ICU-performance. In *Organizational Risk Factors for Job Stress* (Sauter S.L. & Murphy L.R., eds), APA Books, Washington, DC, pp. 259–271.
- Schutte N., Toppinnen S., Kalimo R. & Schaufeli W.B. (2000) The factorial validity of the Maslach Burnout Inventory – general survey across occupational groups and nations. *Journal of Occupational and Organizational Psychology* 73, 53–66.
- Shirom A. (2003) Job related burnout: a review. In *Handbook of Occupational Health Psychology* (Quick J.C. & Tetrick L.E., eds), American Psychological Association, Washington, DC, pp. 245–264.
- Tummers G.E.R., Van Merode G.G. & Landeweerd J.A. (2002) The diversity of work differences, similarities, and relationships concerning characteristics of the organization, the work and psychological work reactions in intensive care and non-intensive care nursing. *International Journal of Nursing Studies* 39, 841–855.
- Uchino B., Hsee C.K., Hatfield E., Carlson J.G. & Chemtob C. (1991) *The Effect of Expectations on Susceptibility to Emotional Contagion*. Unpublished manuscript, University of Hawaii, Hawaii.
- Van der Doef M. & Maes S. (1999) The Job Demand-Control (-Support) Model and psychological well-being: a review of 20 years of empirical research. *Work and Stress* 13, 87–114.
- Van Veldhoven M., De Jonge J., Broersen S., Kompier M. & Meijman T. (2002) Specific relationships between psychosocial job conditions and job related stress: a three-level analytic approach. *Work and Stress* 16, 207–228.
- Woodhouse G. (1996) *Multilevel Modelling Applications: a Guide for Users of MLn*. Institute of Education, University of London, London.