Int Arch Occup Environ Health (2007) 80:433–441
DOI 10.1007/s00420-007-0169-0

ORIGINAL ARTICLE

Burnout and effort–reward-imbalance in a sample of 949 German teachers

Thomas Unterbrink · Anna Hack · Ruth Pfeifer · Veronika Buhl-Grießhaber · Udo Müller · Helmut Wesche · Markus Frommhold · Klaus Scheuch · Reingard Seibt · Michael Wirsching · Joachim Bauer

Received: 7 August 2006 / Accepted: 3 January 2007 / Published online: 10 February 2007

Abstract
Objectives High rates of teachers' premature retirement initiated a research investigating their occupational burden. The aim of this study was to elaborate on and extend previous investigations exploring (1) teacher burnout and (2) the relationship between teachers' efforts and their rewards.
Methods A sample of 949 German teachers in 10 Gymnasien (grammar schools) and 79 Hauptschulen (secondary modern schools) was investigated applying the Maslach Burnout Inventory (MBI-D) and the Effort Reward Imbalance Inventory (ERI).
Results Compared with other studies investigating burnout in employees, we found high rates of burnout symptoms such as emotional exhaustion, depersonalisation, and low personal accomplishment. Male teachers showed significantly lower personal accomplishment and more depersonalization than female teachers. With respect to school types, teachers in Hauptschulen were more often affected by emotional exhaustion and showed more depersonalization. Part-time teachers felt less personal accomplishment than full-time teachers. The ERI cut off was exceeded by 21.6% of all teachers indicating that this subgroup is affected by an imbalance between too much effort and too little reward. With respect to the ERI, significant differences were found for school types, with a higher proportion of Hauptschulen teachers being above this cut off.
Conclusions At present, the working situation of teachers appears to be characterized by a perceived imbalance of effort and reward and is associated with a high risk of developing burnout symptoms.

Keywords Teacher · Burnout · Health conditions · Occupational burden · Stress

T. Unterbrink · A. Hack · R. Pfeifer · M. Wirsching · J. Bauer (✉)
Abteilung für Psychosomatische Medizin und Psychotherapie, Universitätsklinikum Freiburg, Hauptstr. 8, 79104 Freiburg, Germany
e-mail: joachim.bauer@uniklinik-freiburg.de

U. Müller · H. Wesche
Regierungspräsidium Freiburg, Eisenbahnstr. 68, 79098 Freiburg, Germany

K. Scheuch · R. Seibt
Technische Universität Dresden, Institut und Poliklinik für Arbeits-und Sozialmedizin, Fetscherstr. 74, 03107 Dresden, Germany

V. Buhl-Grießhaber · M. Frommhold
Staatliches Seminar für Didaktik und Lehrerbildung (Gymnasien und Sonderschulen) Freiburg, Kunzenweg 21, 79117 Freiburg, Germany

Introduction

Rates of premature retirement among German school teachers due to serious health disorders are consistently higher than those of other employees in public services (Statistisches Bundesamt 2005). According to statistical data collected for the year 2004, the rate of teachers going into premature retirement, if expressed as a percentage of all retired teachers within 1 year, amounted to 28% compared to 20% in the case of other public employees. In the same year, only 26% of teachers reached normal retirement age, compared to 54% of other employees in public services. A representative study analyzing more than 5,000 medical

reports of teachers before their premature retirement showed that 52% of these retirements were caused by psychiatric and/or psychosomatic disorders (Weber et al. 2002, 2004).

A look at teachers still on duty shows, that a remarkable percentage of teachers experience a personal situation that has been described as ''Burnout syndrome''. This syndrome, first described by Herbert Freudenberger in 1974 (Freudenberger 1974), was later operationalized by Christina Maslach and Susan Jackson (Maslach et al. 1996; Maslach and Jackson 1984, 1981) and was defined as a combination of (1) emotional exhaustion, (2) low personal accomplishment, and (3) depersonalization, the latter meaning a cynical stance towards the client they are working for. Uwe Schaarschmidt and colleagues, using a new inventory designated as AVEM (Arbeitsbezogenes Verhaltens- und Erlebensmuster), found that on a nationwide level 29% of German teachers belong to AVEM ''type B'' describing a burnout pattern (Schaarschmidt and Fischer 2001, 1997; Schaarschmidt et al. 1999; for review see Schaarschmidt 2004). In our own pilot study investigating the mental health situation of more than 400 teachers doing service in Gymnasien (grammar schools) in southwest Germany, we found that, based on measurements using the AVEM inventory, 34% of teachers belonged to AVEM ''type B''. If the SCL90-R symptom check list was applied to the same sample, we found a rate of 20% with scores above 70 pts in the global severity index GSI (Bauer et al. 2005) indicating a significant load with psychosomatic symptoms.

Teachers feel strained by large classes, pupils' behaviour, high work load, frequent changes in the education system, furthermore by their low occupational image and lack of support from colleagues and school heads (Maslach and Jackson 1984; Rudow 2002). Coping patterns and personality factors, such as low self-efficacy (Buschmann and Gamsjäger 1999; Schmitz and Schwarzer 2000; Yoon 2002), missing proactive attitude (Schwarzer et al. 2000), negative mood regulation (Mearns and Cain 2003), unrealistic aspirations (Schmitz et al. 2002), and low job satisfaction, may contribute to teacher burnout. In addition, factors such as general work load, class size, and pupil misbehaviour were consistently described as influencing the ill health of teachers (Abel and Sewell 1999; Boyle et al. 1995; Heyse et al. 2004; Kyriacou 2001; Schaarschmidt 2004; van Dick and Wagner 2001; Yoon 2002). Other aspects remained unclear and conflicting. In particular, the influence of factors such as age, gender, school type, work stressors, and work-related resources was not convincingly resolved (Barth 1997; Buschmann and Gamsjäger 1999; Büssing and Glaser 2000; Clark Carlson and Thompson 1995; Friedman 1991, 1996; Maslach and Jackson 1984; Schwarzer et al. 2000; van Dick and Wagner 2001; Wegner et al. 2004).

The aim of this study was to characterize two aspects of the occupational burden of school teachers: (1) the prevalence of burnout symptoms such as emotional exhaustion, low personal accomplishment, and depersonalisation; (2) the relationship between perceived effort and reward. A shortcoming of the aforementioned studies on teacher burnout (Bauer et al 2005; Schaarschmidt 2004) was that the applied inventory (AVEM), although it is available in an English version, is not (yet) internationally established. Applying two internationally established, reliable, and valid questionnaires [the Maslach Burnout Inventory (MBI) and the Effort-Reward Imbalance Questionnaire (ERI)], we intended to make the working situation of German teachers comparable with those of teachers in other countries. Furthermore, our study which is based on a large sample, may contribute to a data set to which future research may refer making it possible to describe present and future developments in this field.

Materials and methods

This is a cross-sectional study. The study is part of a project entitled ''Health Promotion for Teachers'' initiated and supervised by the ''Bundesanstalt für Arbeitsschutz und Arbeitsmedizin'', an agency of the German Federal Ministry of Labour (Bundesministerium für Arbeit und Soziales) (see also Bauer et al. 2006, this issue).

Description of the sample (Table 1). The study was performed in cooperation with the local School Administration. Teachers were recruited from schools within three districts in the area of Freiburg, a city in Südbaden/Germany (districts Freiburg-Stadt, Breisgau-Hochschwarzwald, Emmendingen). Within these three districts, all teachers working at either Hauptschulen (secondary modern schools, $N = 70$) or Gymnasien (grammar schools, $N = 19$) were asked by letter to participate in the study. Gymnasien are schools qualifying for access to a university, while Hauptschulen are leading to the lowest of all German school qualifications. Questionnaires were sent to 2,484 teachers: 1,370 in Hauptschulen and 1,114 in Gymnasien. Completed questionnaires were received from 949 teachers (38.2%), 426 from Gymnasien, and 523 from Hauptschulen (both 38.2%).

The mean age of our sample was 48.9 years (range 24–65 years; Table 1). About 68.4% was above 44 years, and 37.0% above 54 years. Women were younger than

Table 1 Sociodemographic data of the whole sample and of the subgroups according to gender and school type

	Whole sample	Gender		Chi-square test	Age				Chi-square test	School type		Chi-square test	Working load		Chi-square test
	N = 949 *n* (%)	Male *N* = 339 *n* (%)	Female *N* = 602 *n* (%)	*P*	<35 *N* = 107 *n* (%)	35–44 *N* = 189 *n* (%)	45–54 *N* = 288 *n* (%)	≥55 *N* = 352 *n* (%)	*P*	Gymnasium *N* = 426 *n* (%)	Hauptschule *N* = 523 *n* (%)	*P*	Full time *N* = 622 *n* (%)	Part time *N* = 327 *n* (%)	*P*
Age															
Below 35	107 (11.4)	27 (8.0)	80 (13.4)	**<.001**						49 (11.7)	58 (11.2)	.053	68 (11.1)	39 (12.0)	**.004**
35 to 44	189 (20.2)	62 (18.4)	127 (21.2)							101 (24.1)	88 (17.1)		107 (17.5)	82 (25.3)	
45 to 54	288 (30.8)	87 (25.8)	201 (33.6)							120 (28.6)	168 (32.6)		184 (30.1)	104 (32.1)	
Above 54	352 (37.6)	161 (47.8)	190 (31.8)							149 (35.6)	202 (39.1)		252 (41.2)	99 (30.6)	
Mean age (SD)/*t* test p	48.9 (9.89)	50.7 (9.71)	47.8 (9.84)	**<.001**						48.4 (9.96)	49.2 (9.82)	.241	49.6 (9.87)	47.6 (9.80)	**.003**
Gender															
Male	339 (36.0)				27 (25.2)	62 (32.8)	87 (30.2)	161 (45.9)	**<.001**	196 (46.4)	143 (27.6)	**<.001**	297 (87.6)	42 (12.4)	**<.001**
Female	602 (64.0)				80 (74.8)	127 (67.2)	201 (69.8)	190 (54.1)		226 (53.6)	376 (72.4)		317 (52.7)	285 (47.3)	
Marital status															
Single	182 (19.3)	48 (14.2)	134 (22.3)	**.001**	61 (57.0)	70 (37.0)	31 (10.8)	20 (5.7)	**<.001**	86 (20.3)	96 (18.5)	.064	134 (21.8)	48 (14.7)	**<.001**
Married	624 (66.2)	252 (74.3)	371 (61.6)		46 (43.0)	102 (54.0)	212 (73.6)	258 (73.5)		289 (68.3)	335 (64.5)		375 (61.0)	249 (76.1)	
Widowed	14 (1.5)	2 (0.6)	12 (2.0)		0	0	3 (1.0)	10 (2.9)		5 (1.2)	9 (1.7)		8 (1.3)	6 (1.8)	
Divorced	122 (13.0)	37 (10.9)	85 (14.1)		0	17 (9.0)	42 (14.6)	63 (17.9)		43 (10.2)	79 (15.2)		98 (15.9)	24 (7.3)	
Own children															
No	249 (26.7)	66 (19.6)	183 (30.9)	**<.001**	82 (77.4)	67 (35.6)	48 (17.0)	52 (15.0)	**<.001**	112 (26.7)	137 (26.7)	**.993**	188 (30.9)	61 (18.9)	**<.001**
Yes	683 (73.3)	270 (80.4)	410 (69.1)		24 (22.6)	121 (64.4)	235 (83.0)	295 (85.0)		307 (73.3)	376 (73.3)		421 (69.1)	262 (81.1)	
Number of children living at home															
0	491 (52.9)	168 (50.0)	323 (54.6)	.240	82 (78.1)	75 (40.1)	95 (33.5)	238 (68.8)	**<.001**	213 (51.0)	278 (54.4)	**.010**	360 (59.3)	131 (40.7)	**<.001**
1	179 (19.3)	63 (18.8)	115 (19.4)		13 (12.4)	17.6	65 (22.9)	66 (19.1)		72 (17.2)	107 (20.9)		117 (19.3)	62 (19.3)	
2	187 (20.1)	72 (21.4)	115 (19.4)		8 (7.6)	51 (27.3)	89 (31.3)	37 (10.7)		88 (21.1)	99 (19.4)		92 (15.2)	95 (29.5)	
3 or 4	72 (7.8)	33 (9.8)	39 (6.6)		2 (1.9)	28 (15.0)	35 (12.3)	5 (1.4)		45 (10.8)	27 (5.3)		38 (6.3)	34 (10.6)	
Working load															
Full time	622 (65.5)	297 (87.6)	317 (52.7)	**<.001**	68 (63.6)	107 (56.6)	184 (63.9)	252 (71.8)	**.004**	265 (62.2)	357 (68.3)	.051			
Part time (≤¾-full load)	327 (34.5)	42 (12.4)	285 (47.3)		39 (36.4)	82 (43.4)	104 (36.1)	99 (28.2)		161 (37.8)	166 (31.7)				

Sample size (*N*), number of teachers in each category (*n*), and the percentage of the valid values (%) are indicated

The *P* value represents significance for the difference between the subgroups calculated by a Chi-square test

men ($P < .001$). The age distribution did not differ with respect to the two school types. The mean duration of service amounted to 20.9 years (range 0–41), 39.7% were doing service longer than 25 years, reflecting the high average age. The majority of our sample was female (64.0%), with a higher proportion of women in Hauptschulen (72.4%) than in Gymnasien (53.6%). Nearly 66.2% were married, 19.3% were single, 13.0% divorced, and 1.5% widowed. The proportion of single or divorced teachers was higher among female than among male teachers ($P < .001$). About 73.2% of our sample had children; actually living with their children were 47.1%.

We discriminated between full-time and part-time teachers. The teaching load within our sample ranged from 16 to 100%. The full teaching load is defined as 28 lessons/week in Hauptschulen, and as 25 lessons/week in Gymnasien. In order to reduce complexity and to keep things clearly arranged, we arbitrarily defined teachers working 75% and less as part-time workers, what applied for nearly one-third (34.5%) of our sample. The proportion of women working part time was above that of men ($P < .001$). An interesting effect was observed, if care for at least one child was taken as an independent variable: Female teachers raising at least one child at home, displayed a higher rate of part-time work compared to female teachers without children at home (65.6 vs. 32.2%, $P < .001$). In contrast 8.9% of male teachers caring for at least one child at home worked part time compared with 16.1% in the case of male teachers without children at home ($P = .048$). The proportion of teachers belonging to the oldest age group was significantly higher in full-time teachers than in part-time teachers ($P = .004$). Concerning school types a minor percentage of teachers in Hauptschulen (31.7%) work part time than in Gymnasien (37.8%).

Inventories

The Maslach Burnout Inventory (MBI). This questionnaire was developed by Maslach and Jackson (1984) as a measure for the burnout syndrome. In its German version (MBI-D, Büssing and Perrar 1992) it consists of four subscales, three of them taken from the American version (Maslach et al. 1996): (1) emotional exhaustion, (2) personal accomplishment, and (3) depersonalization (expressing a cynical stance towards the client one is working for). The MBI-D (German version) includes an additional scale ''involvement'' (describing dedication and empathy). Due to this additional scale the MBI-D comprises 25 items, three more than the original MBI. Each of the 25 items can be rated from 0 (never) to 5 (very often). The score of each scale is calculated as the mean (between 0 and 5) based on the items that are allocated to it. While higher scores in emotional exhaustion, depersonalisation, and involvement signify higher burnout symptoms, in the case of personal accomplishment lower scores stand for a higher degree of burnout. The MBI-D applies a six-point scale in each item (range 0–5), while the American versions (MBI General Survey, Educators Survey and Human Services Survey) apply a seven-point scale (range 0–6). In order to make our data comparable with other studies using one of the American versions, we transformed our values (six-point scales) by multiplying the points of each of our items with 6/5.

The Effort-Reward Imbalance Questionnaire (ERI). This instrument was constructed to assess ''high-cost/low-gain'' at work (Siegrist 1996). A constellation of high effort and low reward turned out to contribute to ill health (Siegrist 1996; Kudielka et al. 2004). The ERI consists of two main scales, the effort and the reward scale. The 17 ERI items can be scored with values between 1 and 5. The effort scale with 6 of the 17 items measures parameters of work-related effort resulting in a sum score with values ranging from 6 to 30 points. High scores in this scale reflect high effort. The reward scale with 11 items is resulting in a sum score with values ranging between 11 and 55. Lower scores in this scale indicate lower reward. The reward scale includes three different subscales: a ''status'' subscale defined by financial and status-related rewards (4 items, sum score 4–20), a second subscale is defined by ''esteem'' rewards (5 items, sum score 5–25), and a third subscale by ''job security'' (2 items, sum score 2–10) (Siegrist 1996; Rödel et al. 2004). After applying a correction factor, the values for effort divided by those for reward result in a quotient i.e., the ERI ratio. According to the test manual, a value of 1 and above reflects an imbalance between (too much) effort and (too little) reward.

Stastical methods. We performed descriptive statistics applying SPSS (13.0). With respect to the metrical variables (MBI scales and ERI scales) we used univariate ANOVA in order to compare subgroups. This made it possible to enter all group factors simultaneously and to calculate, additionally to significances of the group differences, the associated effect sizes. For comparing the subgroups with respect to the ERI cut off we used χ^2 test. Furthermore we used χ^2 and student's t test for comparing our sample with samples of other studies. A P value of <.05 was defined as significant. The effect size was calculated as eta^2 (η^2), i.e. the percentage of the variance in the sample explained by the respective independent variable (group factor). An $\eta^2 = 0.01$ was defined as a small, an $\eta^2 = 0.06$ as a

medium, and an $\eta^2 = 0.14$ as a high effect (Cohen 1988).

Results

Maslach Burnout Inventory (MBI-D) (Table 2). For the whole sample, the values for emotional exhaustion were 2.39 (SD = 0.84), 3.52 (SD = 0.49) for personal accomplishment, 1.49 (SD = 0.81) for depersonalization, and 2.28 (SD = 0.74) for involvement. Male teachers showed more depersonalization ($P < .001$) and less personal accomplishment ($P = .048$). If the whole teacher sample was divided into four age groups according to Table 1 (below 35, 35–44, 45–54, and 55 and above) no significant difference was found in any of the four MBI scales. However, less personal accomplishment, but no differences in the other burnout dimensions, was observed in part-time compared to full-time teachers ($P = .019$). Compared to teachers in Gymnasien, teachers in Hauptschulen scored higher in emotional exhaustion ($P = .001$) and lower in depersonalization ($P = .005$). Other burnout dimensions were not affected by school type. Although the aforementioned differences in the MBI scales were significant, the effect sizes were small ranging between $\eta^2 = .007$ and $\eta^2 = .029$.

Effort Reward Imbalance Questionnaire (ERI) (Table 3). In the whole sample 21.6% of the teachers were above the cut off of 1, indicating a disturbed balance of (too much) effort and (too low) reward (for the definition of this cut off see the Materials and methods section). The mean of the effort–reward ratio for the whole sample was 0.81 (SD = 0.30). Gender and school type did not affect the ratio. However, age made a difference: teachers younger than 35 or between 35 and 44 had a significant lower mean ratio than those of the two older age groups ($P = .003$). Also working part time vs. full time had an effect: Compared to part-time teacher the ERI ratio of teachers working full time was significantly higher ($P = .008$). The full-time teachers averaging 24.2% were above the ERI cut off of 1 compared to 16.5% in the part-time subgroup ($P = .007$).

If the ERI subscales (effort, status, esteem, job security) were examined separately (Table 3), significant influences of gender, age, school type, and working load can be observed. Male teachers regarded their status as less satisfying than their female colleagues ($P = .025$). Furthermore, older teachers indicated elevated values for effort ($P < .001$). However, the highest scores were observed not within the very oldest group, but in the group between 45 and 54. Along the same line, those between 45 and 54 scored lower in the "status" subscale compared to all other age groups ($P = .011$). School types also influenced the reward that teachers felt. Teachers in Hauptschulen felt less esteem than teachers in Gymnasien ($P < .001$). Compared to Hauptschulen, significantly higher values of the global reward scale were indicated by teachers in Gymnasien ($P = .006$). Also the working load affected the effort scale: Compared to part-time teachers, those working full time had higher values in the effort scale ($P = .001$). On the whole, the observed significances have effect sizes that have to be classified as small with the η^2 ranging between .005 and .04.

Discussion

We found that the teachers of our sample indicated a relatively high degree of burnout symptoms compared to values in other studies (see later). Furthermore, based on the ERI questionnaire, 21.6% of the teachers belong to a so-called effort–reward imbalance risk group.

Conclusions from our data should be drawn with caution, since only 38.2% of the addressed 2,484 teachers returned the questionnaires. However, the sample on which our study is based is fairly representative with respect to age, gender, and distribution among the two school types (data provided by the supervisory school authority, Regierungspräsidium Freiburg). Our sample is characterized by two attributes that reflect the general situation of teachers in German schools. First, the ratio between female and male teachers was about 2:1. Secondly, the mean age (48.9 years) was quite high. Although our return rate of 38.2% may appear as low, it is similar to return rates reported by comparable investigations. Reported return rates in studies dealing with teachers' health are between 34 and 63% (van Dick and Wagner 2001; Yoon 2002; Bauer et al. 2005). However, studies with higher return rates than in our present study dealt with smaller numbers of teachers. Since our sample size did not allow personal addressing we faced a lower return rate, which may have created a bias.

According to Körner (2003) and Schmid (2003), the more heavily burdened teachers tend not to return the questionnaires. As a consequence, our sample would reflect a selection of somewhat less burdened teachers. However, since in our sample parameters, such as gender, age, and school type, were representative, we assume that this possible bias is limited. Further limitations of the representativeness of our study result from the fact that only two school types were included,

Table 2 Scores of the Maslach Burnout Inventory (MBI-D) differentiated according to gender, age, school type and working load

	Whole sample	Gender		Anova *P*	Age				Anova *P*	School type		Anova *P*	Working load		Anova *P*
		Male	Female		<35	35–44	45–54	≥55		Gymnasium	Hauptschule		Full time	Part time	
	N = 949 M (SD)	*N* = 339 M (SD)	*N* = 602 M (SD)		*N* = 107 M (SD)	*N* = 189 M (SD)	*N* = 288 M (SD)	*N* = 352 M (SD)		*N* = 426 M (SD)	*N* = 523 M (SD)		*N* = 622 M (SD)	*N* = 327 M (SD)	
Exhaustion	2.39 (0.84)	2.38 (0.82)	2.39 (0.85)	.735	2.23 (0.78)	2.41 (0.79)	2.46 (0.84)	2.37 (0.88)	.125	2.29 (0.85)	2.47 (0.83)	**.001**	2.42 (0.83)	2.34 (0.85)	.153
Personal accomplishment	3.52 (0.49)	3.48 (0.50)	3.54 (0.49)	**.013**	3.51 (0.45)	3.46 (0.49)	3.55 (0.48)	3.54 (0.51)	.178	3.52 (0.48)	3.52 (0.48)	.143	3.55 (0.51)	3.48 (0.46)	**.019**
Depersonalization	1.49 (0.81)	1.67 (0.76)	1.38 (0.83)	**<.001**	1.52 (0.85)	1.56 (0.81)	1.49 (0.82)	1.44 (0.80)	.062	1.47 (0.79)	1.50 (0.83)	**.005**	1.52 (0.81)	1.42 (0.81)	.960
Involvement	2.28 (0.74)	2.31 (0.71)	2.24 (0.75)	.200	2.25 (0.69)	2.26 (0.72)	2.25 (0.72)	2.33 (0.76)	.685	2.25 (0.75)	2.30 (0.73)	.306	2.29 (0.72)	2.26 (0.78)	.937

Means (M) and standard deviations (SD) are indicated

The *P* value represents significance for the difference between the subgroups calculated with univariate ANOVA (SPSS 13.0)

Table 3 Scores of the Effort Reward Imbalance Questionnaire (ERI) differentiated according to gender, age, school type, and working load

	Whole sample	Gender		Anova *P*	Age				Anova *P*	School type		Anova *P*	Working load		Anova *P*
		Male	Female		<35	35–44	45–54	≥55		Gymnasium	Hauptschule		Full time	Part time	
	N = 949 M (SD)	*N* = 339 M (SD)	*N* = 602 M (SD)		*N* = 107 M (SD)	*N* = 189 M (SD)	*N* = 288 M (SD)	*N* = 352 M (SD)		*N* = 426 M (SD)	*N* = 523 M (SD)		*N* = 622 M (SD)	*N* = 327 M (SD)	
Effort	18.2 (4.24)	18.3 (4.39)	18.2 (4.14)	.167	16.2 (4.11)	17.6 (4.02)	18.8 (3.94)	18.7 (4.40)	**<.001**	18.1 (4.13)	18.3 (4.19)	.960	18.6 (4.25)	17.5 (4.15)	<.001
Reward	43.5 (7.04)	42.9 (7.27)	43.8 (6.89)	.186	44.1 (7.00)	43.6 (6.44)	43.0 (7.08)	43.6 (7.29)	.611	44.1 (6.67)	43.0 (7.30)	**.006**	43.1 (7.23)	44.1 (6.65)	.381
Status	15.7 (3.36)	15.3 (3.35)	15.9 (3.36)	**.025**	15.7 (3.26)	16.0 (3.16)	15.1 (3.47)	16.0 (3.38)	**.011**	15.8 (3.20)	15.6 (3.49)	.142	15.6 (3.39)	15.9 (3.30)	.732
Esteem	20.1 (4.12)	19.9 (4.24)	20.2 (4.04)	.432	20.5 (4.05)	20.0 (3.96)	20.2 (4.09)	20.0 (4.23)	.465	20.7 (3.83)	19.6 (4.30)	<.001	19.9 (4.19)	20.4 (3.98)	.639
Job security	7.75 (1.48)	7.67 (1.34)	7.79 (1.56)	.598	8.00 (1.65)	7.76 (1.39)	7.66 (1.47)	7.72 (1.48)	.411	7.67 (1.42)	7.82 (1.53)	.233	7.70 (1.47)	7.83 (1.51)	.657
ERI ratio	0.81 (0.30)	0.83 (0.32)	0.80 (0.29)	.896	0.71 (0.29)	0.77 (0.26)	0.84 (0.30)	0.83 (0.32)	**.003**	0.79 (0.28)	0.82 (0.31)	.101	0.83 (0.32)	0.76 (0.26)	**.008**
ERI—risk assessment	*n* (%)	*n* (%)	*n* (%)	Chi^2	*n* (%)	*n* (%)	*n* (%)	*n* (%)	Chi^2	*n* (%)	*n* (%)	Chi^2	*n* (%)	*n* (%)	Chi^2
Risk group (>cutoff = 1)	197 (21.6)	79 (24.0)	117 (20.2)	.185	16 (15.2)	32 (17.5)	65 (23.6)	82 (24.3)	.095	81 (19.6)	116 (23.2)	.183	145 (24.2)	52 (16.5)	**.007**

Means (M) and Standard deviations (SD) and the number (*n*) and percentage (%) of teachers above the ERI-cut off are indicated

The *P* value represents significance for the difference between the subgroups calculated with univariate ANOVA and by a Chi-square test (SPSS 13.0)

and finally, that the survey, instead of being conducted also in a metropolitan environment, was done only in and around a medium-sized city. In spite of the aforementioned limitations we feel that our data give a realistic description of the professional situation of teachers.

Teachers of our sample showed a relatively high degree of burnout symptoms when compared with data of other studies. Teachers in our sample indicated higher means for emotional exhaustion (25.91) than a mixed US sample of professionals working in psychosocial fields (20.99, $P < .001$) (Maslach et al. 1996). This also applies if exhaustion of our sample is compared with that of an American teacher sample (21.25, $P < .001$) (Maslach et al. 1996). However, compared to this latter sample lower values for depersonalization were found in our teacher sample (8.91 vs. 11.00, $P < .001$). With respect to personal accomplishment, our mean value was lower than that of the aforementioned mixed US sample (33.84 vs. 34.58, $P < .001$), while there was no difference to the US teacher sample (33.54).

Our sample also displayed higher values for emotional exhaustion (25.91) than a previously analyzed German teacher sample (19.54, $P < .001$), a Chinese teacher sample (22.37, $P < .001$) (Schwarzer et al. 2000), and another German teacher sample (18.38, $P < .001$) investigated by Barth (1997). If our data are compared with these studies, our sample also displayed higher values for depersonalization: 8.91 vs. 5.71 (German teachers, Schwarzer; $P < .001$), vs. 6.36 (Chinese teachers, Schwarzer; $P < .001$) and vs. 5.61 (German teachers, Barth; $P < .001$). Personal accomplishment was found to be lower in our sample compared with both the other German samples [33.84 vs. 34.93, $P = .002$ (Schwarzer) and 32.39, $P = .003$ (Barth)] but higher compared with the Chinese sample [29.79; $P < .001$ (Schwarzer)]. In an overall perspective, our sample seems to be more affected by burnout compared to previous investigations with teachers. With respect to Germany, the situation of teachers may have worsened in recent years.

How may the observed burnout symptoms be explained? Beside other factors, an imbalance between perceived effort and reward may contribute to professional burnout. Our study made use of the Effort-Reward-Imbalance Questionnaire (ERI). According to Siegrist (2001), an effort reward imbalance predicts occupational stress especially in psychosocial work environments. In our sample, 21.6% of the teachers displayed an ERI ratio above 1, indicating that effort outweighs reward. Our sample's mean value of 0.8 is higher ($P < .001$) than the value of 0.53 described in a study by Dragano et al. (2004) referring to a representative working population sample in three German cities ($n = 4484$). Our mean ERI ratio was also above that indicated by Kudielka (0.65, $P < .001$) referring to a sample of 709 employees of two German companies (Kudielka et al. 2004).

With respect to the ERI parameters we found some interesting group differences within our sample. Not surprisingly full-time teachers have a worse ratio between effort and reward than part-time teachers. Our data indicate that this is caused by the increased effort reported by full-time teachers. Thus it appears that increasing time spent working in school is correlated with increasing effort but not with increasing reward. Older teachers have a worse ERI ratio, due to their high scores in the effort scale. Decreasing resilience along age may cause an increase in perceived effort. A further subgroup difference in the ERI parameters was observed between teachers of the different school types. Teachers in Hauptschulen felt less rewarded. This may be a consequence of a higher degree of behavioural disorders caused by the fact that pupils in Hauptschulen come from less privileged social environments.

Although the aforementioned differences were significant, the effect sizes turned out to be rather small. With respect to the MBI, this fits with the findings of Candová (2005) who found that personal expectations and aims have a strong influence in experiencing stress and strain (see also Barth 1997). This is the probable reason why significant group differences explain only small parts of the total variances in the burnout parameters. Similarly, the results of the ERI are strongly determined by personal variables such as e.g. unrealistic aspirations or intrinsic claims (Heyse et al. 2004, Schmitz 2004). As a consequence our group differences explain only a small part of the variances in the ERI scales and subscales.

In conclusion, we found a high percentage of teachers with both burnout symptoms and an imbalance characterized by high effort and low reward in their professional life. This situation obviously calls for preventive measures. Necessary changes should probably include several aspects, first of all smaller class sizes. In addition teachers should receive support improving their interpersonal skills, since during the last years pupils have become more difficult clients. The latter is indicated by an increasing rate of violence in schools. As a helpful measure, we set up Balint-like supervision groups providing teachers with the opportunity to reflect stressful elements of their work.

Acknowledgments This work was supported by the Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Berlin. We are grateful to Dr. Jürgen Kopske and Dr. Uwe Rose, Bundesanstalt für Arbeitsschutz, who helped with respect to the design of the study and repeatedly gave valuable advice. We are also indebted to Siegfried Specker, Head of the ''Abteilung Schule und Bildung'' of the Regierungspräsidium Freiburg, for his valuable support.

References

Abel MH, Sewell J (1999) Stress and burnout in rural and urban secondary school teachers. J Educ Res 92:287–293

Barth A-R (1997) Burnout bei Lehrern. 2. unveränd. Auflage, Hogrefe, Göttingen

Bauer J, Stamm A, Virnich K, Wissing K, Kriston L, Müller U, Weng G, Stürmlinger R, Wirsching M, Schaarschmidt U (2005) Correlation between burnout syndrome and psychological and psychosomatic symptoms among teachers. Int Arch Occup Health 79:199–204

Bauer J, Unterbrink T, Hack A, Pfeifer R, Buhl-Grieshaber V, Müller U, Wesche H, Frommhold M, Seibt R, Scheuch K, Wirsching M (2006) Working conditions, adverse events, and mental health problems in a sample of 949 German teachers. Int Arch Occup Environ Health (this issue)

Boyle GJ, Borg MG, Falzon JM, Baglioni Jr AJ (1995) A structural model of the dimensions of teachers' stress. Br J Educ Psychol 65:49–67

Buschmann I, Gamsjäger E (1999) Determinanten des Lehrer-Burnout. Psychologie, Erziehung, Unterricht 46:281–292

Büssing A, Glaser J (2000) Four-stage process model of the core factors of burnout: the role of work stressors and work-related resources. Work Stress 14:329–346

Büssing A, Perrar K-M (1992) Die Messung von Burnout. Untersuchung einer deutschen Fassung des Maslach Burnout Inventory (MBI-D). Diagnostica 38:328–353

Candová A (2005) Determinanten der beruflichen Belastung von jungen Lehrerinnen und Lehrern: Eine Längsschnittstudie. Erlangen - Nürnberg

Clark Carlson B, Thompson JA (1995) Job burnout and job leaving in public school teachers: implications for stress management. Int J Stress Manage 2:15–29

Cohen J. (1988) Statistical power analysis for the behavioral sciences, 2nd edn. Erlbaum, Hillsdale

van Dick R, Wagner U (2001) Stress and strain in teaching: A structural equation approach. Br J Educ Psychol 71:243–259

Dragano N, Menrath I, Rödel A, Siegrist J, Weyers S (2004) Soziale Gratifikationen und Gesundheit: Ein medizinsoziologischer Ansatz zur Erklärung differentieller Morbidität. Abschlussbericht für die deutsche Forschungsgemeinschaft

Freudenberger HJ (1974) Staff-burn-out. J Soc Issues 30:159–165

Friedman IA (1991) High- and low-burnout schools: school culture aspects of teacher burnout. J Educ Res 84:325–333

Friedman IA (1996) Multiple pathways to burnout: cognitive and emotional scenarios in teacher burnout. Anxiety Stress Coping 9:245–259

Heyse H., Krampen G, Schui G, Vedder M (2004) Berufliche Belastungen und Belastungsreaktionen früh- vs. alterspensionierter Lehrkräfte in der Retrospektive. Reportpsychologie 29:372–379

Körner SC (2003) Das Phänomen Burnout am Arbeitsplatz Schule: ein empirischer Beitrag zur Beschreibung des Burnout-Syndroms und seiner Verbreitung sowie zur Analyse von Zusammenhängen & potentiellen Einflussfaktoren auf das Ausbrennen von Gymnasiallehrern. Logos, Berlin

Kudielka BM, von Känel R, Gander M-L, Fischer JE (2004) Effort-reward-imbalance, overcommitment and sleep in a working population. Work Stress 18:167–178

Kyriacou C (2001) Teacher stress: directions for future research. Educ Rev 53:27–35

Maslach C, Jackson S (1984) Burnout in organizational settings. In: Oskamp S (ed) Applied social psychology annual. Sage, Beverly Hills, pp 133–153

Maslach C, Jackson S (1981) The measurement of experienced Burnout. J Occup Behav 2:99–113

Maslach C, Jackson S, Leiter M (1996) Maslach burnout inventory manual, 3rd edn. Consulting Psychologists Press, Inc., Palo Alto

Mearns J, Cain JE (2003) Relationship between teachers' occupational stress and their burnout and distress: roles of coping and negative mood regulation expectancies. Anxiety Stress Coping 16:71–82

Rödel A, Siegrist J, Hessel A, Brähler E (2004) Fragebogen zur Messung beruflicher Gratifikationskrisen: Psychometrische Testung an einer repräsentative Stichprobe. Zeitschrift für Differentielle und Diagnostische Psychologie 25:227–238

Rudow B (2002) Arbeits- und Gesundheitschutz im Lehrerberuf - Grundlagen und Methoden. In: Badura B, Litsch M, Vetter C (eds) Fehlzeiten-Report 2001. Springer, Berlin, pp 136–149

Schaarschmidt U (2004) Halbtagsjobber? Beltz, Weinheim

Schaarschmidt U, Fischer A (1997) AVEM—ein diagnostisches Instrument zur Differenzierung von Typen gesundheitsrelevanten Verhaltens-und Erlebens gegenüber der Arbeit. Zeitschrift für Differentielle und Diagnostische Psychologie 18

Schaarschmidt U, Fischer A (2001) Bewältigungsmuster im Beruf. Persönlichkeitsunterschiede in der Auseinandersetzung mit der Arbeitsbelastung. Vandenhoeck & Ruprecht, Göttingen

Schaarschmidt U, Kieschke U, Fischer A (1999) Beanspruchungsmuster im Lehrerberuf. Psychologie in Erziehung und Unterricht 4

Schmid AC (2003) Stress, burnout und coping. WB-Druck, Rieden

Schmitz E (2004) Burnout: Befunde, Modelle und Grenzen eines populären Konzeptes. In: Hillert A, Schmitz E (eds) Psychosomatische Erkrankungen bei Lehrerinnen und Lehrern. Schattauer, Stuttgart New York, pp 51–68

Schmitz G, Schwarzer R (2000) Selbstwirksamkeitserwartung von Lehrern: Längsschnittbefunde mit einem neuen Instrument. Zeitschrift für Pädagogische Psychologie 14:12–25

Schwarzer R, Schmitz G, Tang C (2000) Teacher burnout in Hong Kong and Germany: a cross-cultural validation of the Maslach Burnout Inventory. Anxiety Stress Coping 13:309–327

Schmitz E, Hillert A, Lehr D, Pecho L, Deibl C (2002) Risikofaktoren späterer Dienstunfähigkeit: Zur möglichen Bedeutung unrealistischer Ansprüche an den Lehrerberuf. Zeitschrift für Personalentwicklung 16:415–432

Siegrist J (1996) Soziale Krisen und Gesundheit. Eine Theorie der Gesundheits-förderung am Beispiel von Herz-Kreislauf-Risiken im Erwerbsleben. Gesundheitspsychologie 5. Hogrefe, Göttingen

Siegrist J (2001) A theory of occupational stress. In: Dunham, J (ed) Stress in the workplace: past, present and future. Whurr, London, pp 52–66

Statistisches Bundesamt (2005) Pressemitteilung vom 9. Dezember 2005. http://www.destatis.de

Weber A, Weltle D, Lederer P (2002) Zur Problematik krankheitsbedingter Frühpensionierungen von Gymnasiallehrkräften. Versicherungsmedizin 54:75–83

Weber A, Weltle D, Lederer P (2004) Frühinvalidität im Lehrerberuf: Sozial und arbeitsmedizinische Aspekte. Deutsches Ärzteblatt 101:712–718

Wegner R, Berger P, Krause A, Baur X (2004) Zur Belastung und Beanspruchung von Lehrerinnen und Lehrern mit stationär behandelten psychischen Erkrankungen im Vergleich mit berufstätigen Lehrkräften. Ergo Med 1:17–23

Yoon JS (2002) Teacher characteristics as predictors of teacher-student relationships: stress, negative affect, and self-efficacy. Soc Behav Pers 30:485–494