

# Stress, burnout and health in the clinical period of dental education

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The study examined the extent of stress, burnout and health problems experienced by fourth and fifth year dental students from the three universities of Dresden, Freiburg and Bern. The objectives of the study were to: (i) identify frequent sources of stress and to report the prevalence rates of burnout and health problems in dental students, (ii) determine the rate of students suffering from severe burnout symptoms and (iii) identify stress factors related to the burnout symptoms of emotional exhaustion and depersonalisation. A total of 161 dental students from Dresden, Freiburg and Bern participated in the study. They completed the Psychosocial Stress Inventory, the Maslach Burnout Inventory and the Health Survey Questionnaire. Frequent sources of stress were limitation of leisure time, examination anxiety and the transition stress that was related to the adaptation to the demands of the clinical phase of dental education. Few differences existed between the students of the fourth and the fifth study year. Study-related stress was lowest in Bern and considerably higher in Dresden. Differences of mean levels of burnout symptoms were found only for the burnout dimension of emotional exhaustion. Students from Dresden and Freiburg were more emotionally exhausted than students from

Bern, students from Dresden also reported more health problems than students from Bern or Freiburg. Ten per cent of the dental students suffered from severe emotional exhaustion, 17% complained about a severe lack of accomplishment and 28% reported severe depersonalisation symptoms. Forty-four per cent of the variance of emotional exhaustion was explained by study-related factors such as lack of leisure time, examination anxiety and transition stress. The only predictor of depersonalisation was a lack of social integration, accounting for 3% of the variance. A lack of social integration may be an indicator of low social competence which may cause difficulties in dealing with patients adequately and therefore result in depersonalisation. The results indicate a need to identify the group of students who may have insufficient social skills for dealing adequately with the patients, and to train them accordingly.

**Key words:** stress; burnout; health; dental students.

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## Stress in dentists and dental students

THE PROFESSION of dentistry is considered to be extremely stressful (1). This is true for all stages of the dental career, that is for established dentists, young dentists and dental students. Dentists suffer from especially high degrees of stress even when compared with other health professions (2, 3). Either diverse and extreme demands or a lack of resources which exceed the person's coping capacities can be viewed as the sources of occupational stress (4). Daily interactions with patients, colleagues and staff, time pressure, paper work, defective equipment, or problems in the treatment of patients, etc. are potential stressors for dentists. Young dentists already experience stress, they complain about too much work and report lacking time to reflect on the professional experience they have gathered so far. They worry often about making mistakes, which in turn leads to

an increase of psychological symptoms (2). Even dental students suffer from considerable psychological distress (5). Thirty-six per cent of a sample of undergraduate first-year dental students showed high levels of distress according to the General Health Questionnaire, a finding similar to the results found in a sample of medical students (6). Typical sources of stress for dental students are frequent examinations, reduced leisure time and changing curricula (7). In addition, meeting treatment requirements often involves high demands (anxious patients, time limits, complicated and irreversible interventions, for example tooth extraction, etc.) and possible conflicts (e.g. with the clinical supervisor), which can lead to high stress levels (8). With regard to personal factors, examination phobia, a lack of self-confidence, and the vast difference between the students' expectations and the reality they are confronted with frequently prove to be considerable stressors for dental students. Stressors

related to the instructional environment of students are problems with the clinical staff and inadequate treatment time. On the other hand, patient contact in early stages of dental education proved to be a protective factor because it helps the transfer of scientific knowledge into clinical practice (7).

## Burnout in dentists and dental students

Stress is a state where the individual's resources are exceeded (9). As a result of high demands and continuous occupational stress, professionals working with patients are at risk of developing a burnout syndrome. Burnout can be characterised as the result of chronic stress manifesting itself in psychological and physical exhaustion (10). Symptoms of burnout are emotional exhaustion, reduced personal accomplishment, and depersonalisation, that is an emotional detachment from the patient's needs and a cynical attitude towards these needs. The risk of burnout is particularly high if situational demands and coping capacities and resources are mismatched over a long period of time. Gorter et al. (3) report high general levels of burnout for 13% of the Dutch dentists and found that about one-fifth are at risk to burn out. Burnout amongst dental students has recently become a focus of research, either as a reflection of study conditions or as a predictor of a negative course of the professional career of dentists. A European multi-centre study (5) indicates a high level of emotional exhaustion amongst dental students, 22% of them achieved high scores on the Maslach Burnout Inventory (MBI) emotional exhaustion scale. This percentage is considerably higher than the rate of 5% of medical students with high emotional exhaustion scores (6). Risk factors for the development of a burnout syndrome during dental education or in the later professional life are continuous strain, lack of feedback and value conflicts. On the other hand, age, life conditions and especially early patient contact act as protective factors against stress and burnout, particularly in the first years of study. Further, supervision, feedback and clear perspectives are helpful for successful stress management and the prevention of burnout in dental education (5, 7, 8).

## Health status of dentists and dental students

Studies on the physical health of dentists (2, 3, 11) report that dentists appraise their health and physical condition negatively and suffer from psychological

symptoms (2). They report physical complaints such as back pain, muscle pain and fatigue which they view as being work-related (3). Complaints such as these can affect the efficiency at work negatively. An unhealthy life style, for example little physical exercise or bad eating habits, can also have a detrimental influence on the physical condition (11). High alcohol consumption, for example, is rather frequent amongst dentists (2, 3). Alcohol abuse was positively related not only to vulnerability factors such as dysfunctional family background and low self-esteem but also to length of career and rural type of practice (12). Twenty per cent of the dentists in their late career stages and 21% of the dentists working in rural practices reported clinically relevant levels of alcohol consumption. A particularly interesting finding was that those dentists who reported higher levels of alcohol consumption in later years of their career also had tended to drink excessively during dental education. In a sample of British dentists (13), 35% of the male dentists and 36% of the female dentists reported to drink beyond sensible limits, and 48% of the men and 52% of the women reported binge drinking. The numbers found in a sample of dental undergraduates in the UK (14) were similarly high. Sixty-three per cent of the male and 42% of the female students reported to drink beyond 'sensible limits' for their gender or even to drink excessively (binge drinking) from time to time (56% of the men and 58.5% of the women). In another study 20% of the Dutch dental students reported drinking five or more drinks on the same occasion on at least 5 days during the last month, 17% reported to get drunk at least once a month (15). The high numbers of physical complaints and alcohol abuse amongst dentists and dental students indicate that further investigations are necessary to gather more information on the health status of dental students and its effect on their long-term dental career.

The objectives of the study were to: (i) identify frequent sources of stress and to report the prevalence of burnout and health problems in dental students during the clinical part of the training, (ii) determine the rate of students suffering from severe burnout symptoms and (iii) identify stress factors related to the burnout symptoms of emotional exhaustion and depersonalisation.

## Methods

### *Participants*

The dental schools of Dresden, Freiburg and Bern participated in the study. All three universities offer

5-year programmes of dentistry. In Freiburg and Bern the training of dental students is based on traditional instructional methods (lectures and seminars), and in Dresden traditional instruction and problem-based learning are combined. The three universities were included to increase the sample size and to provide a range of study conditions. The objective of the study was to include all fourth and fifth year students in the study to assess stress, burnout and health status during the period of clinical training.

### Procedure

The participants completed a set of questionnaires covering questions on socio-demographic characteristics and questionnaires on study-related stress, burnout and health. The data collection took place during one lecture at each of the universities. The lecturer explained the aims of the study and asked for the students' cooperation. He or she then distributed the questionnaires and collected them after they had been completed. Participation in the study was anonymous and voluntary. The data was collected in the middle of the winter term of 2002.

### Instruments

Sources of stress in the clinical study period were assessed by the Psychosocial Stress Inventory (PSSI) (K. Pöhlmann, W. Harzer, unpublished data). The questionnaire consists of 24 statements which were rated on a scale ranging from 0 = not stressful to 5 = highly stressful. Five scales representing various stress factors were identified by means of factor analysis. Scale 1 contains five statements referring to *limited leisure time* (e.g. studying does not leave me enough time for other activities), scale 2 consists of five items dealing with *examination anxiety* (e.g. I worry about failing exams all the time), the third scale, *transition stress*, includes five statements describing difficulties in adapting to the specific demands of the clinical period of dental training (e.g. I find dealing with patients often difficult and strenuous), a fourth scale with four items represents the degree of *social integration* experienced by the dental students (I have found many friends amongst my fellow dental students), and the fifth scale (five items) measures the degree the dental students *worry* about their competence as a dentist (I am not sure whether I possess the necessary psychomotor skills to become a good dentist). The internal consistency of the scales (Cronbach's alpha) ranges from 0.70 (social integration) to 0.85 (examination anxiety). The intercorrelations of the scales range from  $r = 0.34$  (limited leisure time and worry) to  $r = 0.57$  (examination anxiety and worry).

The PSSI also assesses the degree of stress caused by the disciplines of the clinical training. A similar rating was applied by Newton et al. (8). The students were asked to rank the seven disciplines of cariology, endodontics, periodontology, prosthetic dentistry, maxillofacial and oral surgery, orthodontics, and paediatric dentistry according to how stressful they found each discipline. Students from Dresden additionally appraised how demanding they found an interdisciplinary comprehensive care course which deals with treating one patient comprehensively for several problems. Burnout was measured by the Maslach Burnout Inventory (MBI) (17). The MBI is considered to be the standard instrument for the assessment of burnout. Based on 22 items it measures the three burnout components of emotional exhaustion (I feel drained by my work, nine items), lack of accomplishment (I can handle the problems of my patients very well, eight items) and depersonalisation (I feel I treat my patients as if they were impersonal objects, five items). We used the German adaptation of the instrument (18). Each statement is rated on a 4-point scale (1 = not true, 4 = exactly true). High scores on the scales indicate that the person is emotionally exhausted, experiences a lack of accomplishment and feels detached from the patients. The internal consistency scores (Cronbach's alpha) of the German version are  $\alpha = 0.88$  (emotional exhaustion),  $\alpha = 0.82$  (lack of accomplishment) and  $\alpha = 0.69$  (depersonalisation) (19).

Health status was assessed by the German version of the Health Survey Questionnaire (SF-12) (20), a short version of the SF-36 Health Survey Questionnaire (21) which is frequently used internationally. The SF-12 provides composite scores for both physical health and mental health. A comparative study in nine countries on the psychometric qualities of the SF-12 and the SF-36 (22) demonstrated that the two scales of the short version could be reliably identified in each of the national samples and that the two scores of the short version correlated highly with the composite scores for physical and mental health of the SF-36 ( $0.92 < r < 0.99$ ) in each of the nine countries.

### Statistical analyses

The statistical analysis of the data was conducted by SPSS version 10 (23) and included frequency distributions, chi-square tests, analyses of variance and regression analyses. To determine whether the extent of stress and burnout experienced by dental students in the clinical stage of their education was different in Dresden, Freiburg, and Bern,  $2 \times 2$  (university  $\times$  study year) ANOVA were conducted. A first step of the data

analysis was to check for sex differences. As no sex differences could be found for stress factors, burnout and health status, sex was not entered as a factor into the variance analysis. The same ANOVA was carried out to find out whether differences in the health status existed between the three universities and the fourth and fifth study year in the clinical period of the training. Post hoc tests comparing mean values of the three universities were performed according to Scheffé (24). To identify stress factors contributing to the burnout symptoms of emotional exhaustion and depersonalisation, stepwise multiple regression analyses were conducted. The alpha level was set to  $P = 0.05$  for all analyses.

## Results

The participants comprised 161 fourth and fifth year dental students from the three universities of Dresden, Freiburg and Bern. The three samples were similar in terms of gender ratio and age distribution and in the percentage of fourth and fifth year students from each Dental School that participated. The response rate ranged from 74% (Freiburg) to 100% (Bern) (Table 1).

### Sources of stress in the clinical period of dental education

Figure 1 gives an overview on the extent of stress experienced in the clinical period of dental education at the three dental schools of Dresden, Freiburg and Bern. Limited leisure time was reported to be the biggest source of stress at all three universities. Other sources of considerable stress proved to be examination anxiety and the transition stress related to adapting to the clinical part of training.

The three universities differed significantly in how much examination anxiety ( $F = 12.41$ ,  $P = 0.000$ ), transition stress ( $F = 5.30$ ,  $P = 0.006$ ) and worrying about their own competence ( $F = 3.57$ ,  $P = 0.031$ ) was experienced by the students. Examination anxiety was noticeably lower in Bern than it was both in Dresden

TABLE 1. Demographic characteristics by dental school

	Dresden ( $n = 60$ )	Freiburg ( $n = 54$ )	Bern ( $n = 47$ )	$n = 161$
Sex				
Male	30	30	23	83
Female	30	24	24	78
Age				
M	24.4	26.0	26.0	
SD	2.4	2.4	4.0	
Fourth year	24	27	24	75
Fifth year	36	27	23	86
Response rate (%)	88	74	100	

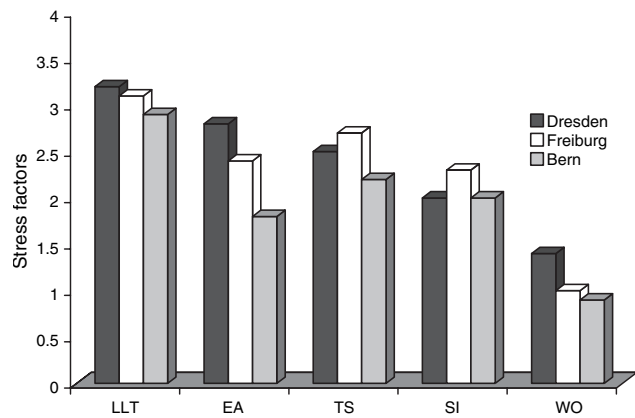


Fig. 1. Stress factors by dental school. LLT, limited leisure time; EA, examination anxiety; TS, transition stress; SI, social integration; WO, worry about competence.

and in Freiburg. Adapting to the clinical study period was, in turn, much more stressful in Freiburg than it was in Bern. And compared with students from Bern, students from Dresden were much more insecure about their own clinical competence. Students in the fourth study year reported to be more restricted in their leisure time due to study demands than fifth year students ( $F = 10.26$ ,  $P = 0.002$ ) and they experienced more transition stress which indicates that they had not yet fully adapted to the specific requirements of clinical training ( $F = 4.56$ ,  $P = 0.035$ ).

The ratings on the amount of stress related to each of the six disciplines of dental education demonstrated that endodontics was considered to be the most demanding course at all three dental schools by both fourth and fifth year students. Prosthetic dentistry was considered to be very demanding by students in Dresden and Freiburg, but much less so in Bern. Students from Dresden assessed an interdisciplinary comprehensive care course that dealt with treating one patient for several problems as similarly demanding as these two courses. Figure 2 presents the appraisals of how demanding the students from the three dental schools found each of the seven disciplines.

Significant differences were found between the three dental schools regarding the requirements posed by the disciplines. Prosthetic dentistry was appraised as much more demanding by students from Freiburg and Dresden than it was by students from Bern ( $F = 4.49$ ,  $P = 0.016$ ). And students at the dental school of Freiburg found periodontology much less demanding than students from Dresden or Bern ( $F = 4.21$ ,  $P = 0.021$ ). Dental students from Bern, on the other hand, found paediatric dentistry much more difficult to master than students from Dresden or Freiburg ( $F = 2.78$ ,  $P = 0.028$ ).

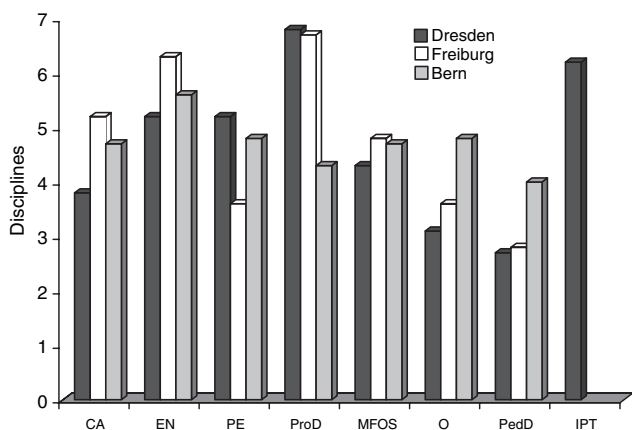


Fig. 2. Stressfulness of disciplines of dental education by dental school. CA, cariology; EN, endodontics; PE, periodontology; ProD, prosthetic dentistry; MFOS, maxillofacial and oral surgery; O, orthodontics; PedD, paediatric dentistry; IPT, integrated patient treatment.

**Health status**

In terms of physical health, no differences could be found between students of the three dental schools and between fourth and fifth year students. Figure 3 presents the health status scores for the sample compared with the norm score for the respective age group of 21–30 years.

The dental students’ physical health scores were very close to that of the norm group. Students from Freiburg and Bern also scored similar to the norm group for mental health. Students from Dresden, however, were significantly less mentally healthy than students from Freiburg or Bern ( $F = 4.63, P = 0.013$ ).

**Burnout and burnout-related stress factors**

Differences in the extent of burnout symptoms existed only for emotional exhaustion. Students from Dresden and Freiburg felt more drained than students from Bern in the fourth as well as in the fifth study year

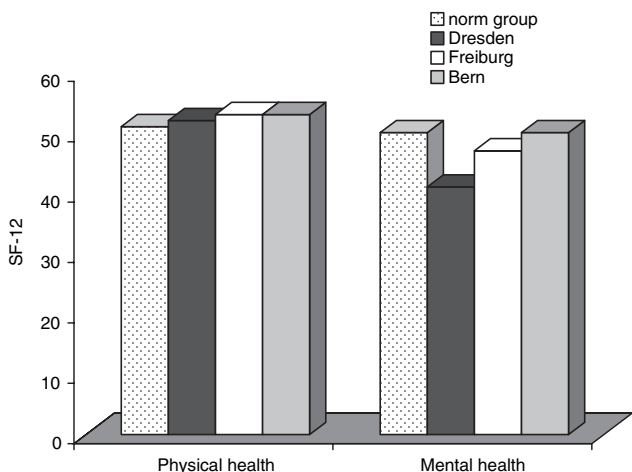


Fig. 3. Health scores by dental school.

(fourth year:  $F = 3.7, P = 0.030$ ; fifth year:  $F = 6.08, P = 0.003$ ). As no differences existed between different study years, Fig. 4 presents the combined burnout scores for fourth and fifth year students from the three dental schools.

To determine the rate of dental students suffering from more severe burnout symptoms, we checked how many students scored one standard deviation above the mean. This procedure identified a group of students with high burnout scores. The rate of students who were severely affected varied greatly between the three components of the burnout syndrome. According to this criterion, 10% of the sample were emotionally exhausted, 17% suffered from a severe lack of accomplishment and 28% scored high on depersonalisation. To check whether students with high burnout scores were distributed equally at the three universities, chi-square tests were conducted. Students scoring high on the burnout dimensions of emotional exhaustion and lack of accomplishment came more frequently from Dresden and Freiburg ( $\chi^2(2) = 8.9, P = 0.012$  and  $\chi^2(2) = 8.8, P = 0.012$  respectively) whilst students reporting high levels of depersonalisation symptoms were equally frequent at the three universities of Dresden, Freiburg and Bern ( $\chi^2(2) = 2.1, n.s.$ ).

To identify factors which contribute to the extent of the burnout symptoms of emotional exhaustion and depersonalisation, hierarchical regression analyses (stepwise method) were conducted with the five psychosocial stress factors as potential predictors. Several factors contributed to the burnout component of emotional exhaustion (Table 2).

The strongest predictor of emotional exhaustion was limitation of leisure activities explaining 30% of the variance. Another 10% of the variance was accounted for by examination anxiety. The third significant predictor of emotional exhaustion, accounting for an additional 4% of the variance, was the amount of

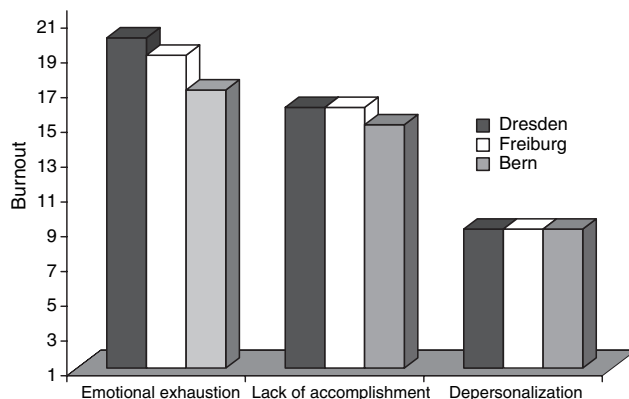


Fig. 4. Burnout scores by dental school.

TABLE 2. Stress factors related to emotional exhaustion

	<i>R</i>	Corr. $R^2$	$R_i^2$	$F_i$	$P_{F_i}$
LLT	0.57	0.32	0.30	64.79	0.000
EA	0.65	0.42	0.10	25.81	0.000
TS	0.67	0.44	0.04	6.62	.011

LLT, limitation of leisure time; EA, examination anxiety; TS, transition stress.

transition stress experienced when entering the clinical phase of training. All three predictors together accounted for 44% of the variance of emotional exhaustion. A second regression analysis was conducted to identify factors contributing to feelings of depersonalisation. Of the five sources of stress covered in the PSSI, only lack of social integration was a significant predictor of depersonalisation, accounting for 3% of the variance.

## Discussion

### Stress

The aim of the study was to examine the extent of stress experienced by dental students in the clinical period of their education. The study included three dental departments to cover a wider range of study conditions. The results confirm that dental students experience considerable stress in the clinical period of dental education. Particularly limitations of leisure time, examination anxiety and the transition stress caused by dealing with the clinical work are experienced as stressful. The three dental schools of Dresden, Freiburg and Bern differed in how much examination anxiety, transition stress and worries about their own competence the students experienced as a dentist. Examination anxiety was notably lower at the dental school of Bern where rules concerning examination are more lenient than at the other two dental schools. Whilst students from Freiburg found it more difficult to adapt to the tasks they faced in the clinical period of training, students from Dresden were more insecure about being a good dentist in future. One reason for their worry might be that they had more patient contact in the comprehensive care course than students from Freiburg or Bern, and were faced with more difficult treatment decisions because they had to treat one individual patient for all the different problems he presented. One finding that supports this argument is that the dental students from Dresden rated the comprehensive care course as just as challenging as the other two very demanding courses, namely prosthetic dentistry and endodontics. On the whole, few differences existed in the extent of

stress experienced by fourth and fifth year dental students, although one exception was found: fourth year students reported higher levels of transition stress than fifth year students which indicates that they were not yet coping effectively with the demands of the clinical work. As the results are based on a new instrument assessing stress factors in dental education, replications of the study are needed before more general conclusions can be drawn.

### Health status

The data on the health status of the dental students show that in general they do not suffer from either physical or mental health problems. However, students from Dresden reported significantly more mental health problems than students from Freiburg or Bern.

### Burnout

For the burnout components of lack of accomplishment and depersonalisation no differences were found between the three dental schools. However, dental students from Dresden felt more emotionally exhausted than students from Freiburg or Bern. The percentage of students suffering from high degrees of burnout symptoms was very different for the three dimensions of emotional exhaustion, lack of accomplishment and depersonalisation. Whilst only 10% of the dental students suffered from emotional exhaustion and 17% felt impaired in their level of performance, 28% reported high levels of depersonalisation.

Emotional exhaustion seems to be closely related to study conditions such as work load and examinations. Its prevalence differs accordingly amongst the three universities of Dresden, Freiburg and Bern. The fact that almost one-third of the students – regardless of which university they came from – suffered from severe depersonalisation is a surprising new finding. Because the studies so far have mainly focused on burnout in terms of emotional exhaustion, results on the extent of depersonalisation amongst dental students that allow for a comparison between our participants and other samples unfortunately are not available. Yet, the burnout dimension of depersonalisation is especially important as it is related to the doctor's attitude towards the patients. It is characterised by emotionally detaching oneself from the needs of the patient. The relatively high percentage of students reporting feelings of depersonalisation might reflect the insecurity of students on how to deal with patients, especially in situations where treatment demands are very high. Although the cross-sectional data do not allow for causal interpretations, the

findings indicate that socially less well-adapted students might be especially at risk of developing difficulties in dealing adequately with patients and of trying to detach themselves emotionally from their needs. For these students, a lack of social competence might constitute the common cause for the lack of positive social relationships with peers on a personal level as well as their feelings of depersonalisation in the professional context. One conclusion to be drawn from the study is, therefore, that a social competence training to enhance communication skills might be helpful especially for these students. The rather high extent of severe depersonalisation symptoms also indicates that social skills should be part of the clinical training in general because it could be beneficial in helping students cope with a crucial part of their work.

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