



# Burnout and light treatment

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## Summary

*The core symptom of the burnout syndrome is emotional exhaustion, which leads to impaired functioning on the job. Studies of sufferers of seasonal affective disorders and of healthy people show that energy levels can be improved by exposing them to bright light. It is hypothesized that energy levels of patients with burnout complaints can similarly be improved by exposure to bright light. In a small study, the effects of light treatment in burnout sufferers were researched. A comparison was made between a treatment condition (n = 16) and a waiting list condition (n = 14). The effects were assessed by means of several self-rating instruments. Patients' energy levels were seen to improve significantly according to the scores on two out of three instruments. If light treatment is administered prior to any other treatment, it is postulated that the results of the second treatment will take effect more quickly. Conclusions can only be preliminary due to the small sample size, but they are encouraging nevertheless. Replication in a study with a larger sample size is desirable. Copyright © 2009 John Wiley & Sons, Ltd.*

## Key Words

*burnout; emotional exhaustion; light treatment*

## Introduction

Burnout is a prolonged response to chronic emotional and interpersonal stressors on the job, and is defined by three dimensions: exhaustion, cynicism and inefficacy (Maslach, Schaufeli, & Leiter, 2001). Burnout has become a serious problem to society, with about 4 per cent of the working population in The Netherlands suffering from severe burnout complaints (Bakker, Schaufeli, & Van Dierendonk, 2000a). The core symptom of burnout is emotional exhaustion (Maslach & Schaufeli, 1993), whose symptom, in particular, leads to impaired functioning on the job (Taris, 2006). Emotional exhaustion has also led to a significant increase of sickness absence (Bekker, Croon, & Bressers, 2005).

The term *burnout* is introduced as a metaphor for a work-related state of emotional exhaustion and being overstressed. By definition, burnout complaints are associated with job dysfunction where people with severe burnout complaints are unable to continue their normal work routines. Although severe burnout complaints constitute an emotional state with severe consequences for the individual, this syndrome has not—so far—been included in any psychiatric classification system. For this reason, mental health care institutions are often confused as to accepting and understanding the diagnosis of burnout. When making a diagnosis, health care professionals pragmatically choose a psychiatric diagnosis from any classification system with the largest degree of overlap of symptoms with burnout complaints. A common definition of burnout is the International Classification of Diseases, 10th revision (ICD-10) (World Health Organization, 1994) diagnosis of work-related neurasthenia (Schaufeli & Enzmann, 1998; Schaap, Keijsers, Vossen, Boelaars, & Hoogduin, 2001;

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Schaufeli, Bakker, Hoogduin, Schaap, & Kladler, 2001).

The symptoms of the burnout syndrome and some psychiatric syndromes overlap, particularly those of depression and emotional exhaustion, as described by Schaufeli and Enzmann (1998). In a meta-analysis, Glass and McKnight (1996) concluded that burnout and depressive symptoms were not just two different terms for the same dysphonic state, nor that they were redundant concepts (see also Schaufeli and Enzmann, 1998; Bakker et al., 2000b; Schaufeli et al., 2001; Ahola et al., 2005; and Sonnenschein, Sorbi, Van Doornen, Schaufeli, & Maas, 2007a).

Although there is little empirical evidence of successful treatment of burnout, activation and cognitive behavioural therapy (CBT) are common treatment procedures (Schaufeli & Enzmann, 1998; Schaap et al., 2001).

In a recent study, De Vente, Kamphuis, Emmelkamp, and Blonk (2008) concluded that CBT-based interventions are not successful in the treatment of patients with clinical levels of work-related stress. These findings are in line with those of Blonk, Brenninkmeijer, Lagerveld, and Houtman (2006), who compared an extensive CBT-therapy and brief CBT-derived interventions with both individual-focussed and workplace interventions in persons with severe work-related psychological complaints to a control group. The combination treatment was superior to CBT and the control group in shortening the duration of the sick leave.

The most pronounced symptom of the burnout syndrome is emotional exhaustion—the lack of energy (Taris, 2006). Individuals with serious burnout complaints suffer from severe fatigue throughout the day, which is uncommon in healthy subjects (Sonnenschein, Sorbi, Van Doornen, Schaufeli, & Maas, 2007b). We assume that this shortage of energy makes it difficult for people to benefit from therapy.

Light therapy has been the most successful treatment for people with seasonal affective disorder (SAD) so far. It has also been shown that mood is not the only aspect that can be improved by light treatment, but that the same holds for energy levels (Avery, Kizer, Bolte, & Hellekson, 2001; Golden et al., 2005; Meesters et al., 1993; Rosenthal et al., 1984; Wileman et al., 2001). In a case study, we described a patient with seasonal fatigue (without mood disorder) who was successfully treated by exposure to light (Meesters & Lambers, 1990). In healthy people, exposure to

bright light has improved energy levels (Rüger, Gordijn, Beersma, De Vries, & Daan, 2005), and in seriously ill people suffering from breast cancer, too, a relationship has been shown between fatigue and exposure to light during chemotherapy or similar treatments (Liu et al., 2005).

If energy levels can be improved after exposure to bright light, it is hypothesised that energy levels of patients with burnout complaints can also be improved after exposing them to bright light.

## Methods

Participants with the diagnosis of burnout were recruited from referrals or after an article in a local newspaper. As a definition for burnout, we used the criteria of neurasthenia according to the ICD 10, which had to be work-related. This diagnosis had to be confirmed after a short standardized clinical interview for Diagnostic and Statistical Manual of Mental Disorders-fourth edition (DSM-IV) (American Psychiatric Association, 1994) and ICD-10 psychiatric disorders [Mini International Neuropsychiatric Interview (MINI)] (Sheehan et al., 1998), with an extra set of questions about burnout complaints containing the criteria of neurasthenia of the ICD-10 that had to be work related. These complaints are work-related if they impair the ability to work.

In addition to the diagnosis of burnout, emotional exhaustion scores on Utrechtse BurnOut Schaal (UBOS) (Schaufeli, & Van Dierendonck, 2000) had to be 3 for inclusion. Participants who were depressed or had another Axis I disorder according to the DSM-IV as assessed by means of the MINI were excluded to minimize the overlap between burnout complaints and psychiatric disorders.

Also excluded were patients suffering from diabetes, epilepsy or eye diseases, and those using psychopharmacological medication, working in shifts or who were already receiving treatment for their burnout complaints.

After they had been included and had given informed consent, the participants were assigned to one of the two conditions. In other studies, it proved impossible, however, to create a real placebo condition for light treatment. For this reason, the effects of light treatment are often compared to those of other treatment modalities or to waiting list conditions. In this pilot study, we compared the results of the treatment condition with those of a waiting list condition.

This trial took 22 days, starting on Fridays. After 3 baseline days, participants in the treatment condition were offered light treatment on 5 consecutive workdays, no light treatment on the 2 days of the weekend, another 5 days of light treatment, after which they were monitored for another 7 days. In the waiting list condition, participants were assessed in the same way as in the treatment condition, but they did not receive light treatment. Participants in the waiting list condition received light treatment during the week after the investigation period had finished. This research protocol had been approved by the hospital's medical ethical committee.

Participants were assessed by means of weekly self-rating questionnaires (on days 1, 8, 15 and 22). These weekly self-ratings were filled out at the clinic.

### *Treatment*

Participants of the treatment condition were exposed to artificial bright light (full spectrum, without ultraviolet (UV), 10,000 lux) for 45 min on weekdays from 8.00–8.45 am at the clinic from December 2005 until September 2006.

This treatment is based on the treatment protocol of our SAD-outpatient clinic and SAD-research protocols we have used (Gordijn, 't Mannetje, & Meesters, 2006).

### *Instruments*

Energy levels were assessed in three different ways [UBOS, Burnout—Neurasthenia Complaints Scale (BO-NKS) and Shortened Fatigue Questionnaire (SFQ)], besides mood [the Dutch version of the Beck Depression Inventory (BDI-II-NL)] and seasonality [Seasonal Pattern Assessment Questionnaire (SPAQ)].

**UBOS.** The UBOS (Schaufeli & Van Dierenonk, 2000) is a Dutch version of the Maslach Burnout Inventory (Maslach & Jackson, 1981), which assesses job-related burnout complaints and divides them into three subscales: emotional exhaustion, depersonalization and lack of professional accomplishment. These items refer to the work situation. The score on the emotional exhaustion subscale is used as an inclusion criterion (score 3 or higher) and outcome measurement.

**BO-NKS.** The BO-NKS assesses the severity of burnout complaints based on the definition, according to the ICD 10, of burnout as work-related neurasthenia (Verbraak, Van de Griendt, & Hoogduin, 2006). The items refer to the complaints without reference to a specific work situation.

**SFQ.** The SFQ (Alberts, Smets, Vercoulen, Garssen, & Bleijenbergh, 1997) is a short, reliable and easily used instrument to determine the intensity of patients' bodily fatigue.

**BDI-II-NL.** Although patients diagnosed with depression according to the DSM-IV criteria were excluded, some distortion of mood could still be shown. Therefore, the BDI-II-NL, the Dutch version of the Beck Depression Inventory (Beck, Steer, & Brown, 1996; 2002) was used to assess aspects of mood.

This questionnaire consists of 21 items. One of these is related to fatigue (15), and another one to energy (20). The first item is a general question about depressive mood. We used the separate scores on these three questions besides the total BDI score. One of the symptoms commonly reported by sufferers from burnout is a disturbed sleep pattern. For this reason, the score on item 16 about changes in sleeping patterns is included.

**SPAQ.** The SPAQ (Rosenthal, Genhart, Sack, Skwerer, & Wehr, 1987) includes an assessment of the seasonality of six items: mood, appetite, weight, sleep, energy and socializing.

### *Statistics*

The proportional improvement scores and effect sizes (Cohen, 1988) were calculated for each condition. The results of the two conditions were then compared by means of analysis of variance with repeated measures.

### *Results*

Sixteen participants (8 male, 8 female) took part in the light treatment condition (mean age 44.6 years  $\pm$  10.8) and 14 in the waiting list condition (8 male, 6 female; mean age 45.9 years  $\pm$  13.0). Six participants were still at work, with five working part-time because of their symptoms. The others reported to be unable to continue their

jobs because of their burnout complaints. The two conditions did not differ in age, gender, level of education, seasonality score on the SPAQ, timing in the season of participation in the design (winter or summer), hours at work or sickness absence (see Table I).

Before the start of the programme, the two conditions did not differ in mood, energy levels and sleep pattern changes as measured by the scores on the different self-rating scales.

The results based on the weekly self-rating questionnaires are shown in Table II.

The improvement after light treatment, as compared with that of the waiting list condition, is statistically significant according to the scores on the BO-NKS ( $F(1,3) = 3.98, p = 0.02$ ), the scores on the SFQ ( $F(1,3) = 3.66, p = 0.03$ ) and the scores on item 16 of the BDI-II ( $F(1,3) = 4.48, p = 0.01$ ). There is a trend in the same direction according to the scores on the UBOS emotional exhaustion subscale ( $F(1,3) = 2.45, p = 0.09$ ) and the BDI-II total score ( $F(1,3) = 2.4, p = 0.09$ ); BDI question 15 ( $F(1,3) = 2.79, p = 0.06$ ). Although there is an improvement in the treatment condition based on the UBOS emotional exhaustion scores compared with the waiting list condition, this difference is not significant. No significant differences between the two conditions based on the other weekly self-rating scores could be shown.

## Discussion

Depending on what assessment instrument is used, this study shows some evidence for the

hypothesis that exposure to light improves the energy levels of patients suffering from burnout complaints. These results are more or less in line with the results of a study of nurses in a university hospital. Daily exposure to at least 3 h of daylight was found to cause less stress and higher job satisfaction, and to have an indirect positive effect in preventing burnout complaints than in groups that were exposed to light less than 3 h daily (Alimoglu & Donmez, 2005). The emotional exhaustion in this study did not differ from that of groups of nurses who were still at work and who were not diagnosed as suffering from burnout complaints.

The diagnosis of burnout was based on the ICD-10 criteria for work-related neurasthenia. The BO-NKS (Verbraak et al., 2006) was developed to assess the severity of these complaints, and because of this, it might be the most suitable instrument used in this study for measuring the burnout syndrome. According to the scores on the BO-NKS, the improvement after light treatment is statistically significant. Improvement after light treatment was also assessed on a weekly basis with the instruments that had questions about fatigue levels (SFQ and item 15 of the BDI-II). There was a trend towards improvement after light treatment based on the UBOS emotional exhaustion subscale. The UBOS assesses subjective experience about the complaints at work during the last week (Schaufeli and Van Dieren-donck, 2000). Most participants did not work the last weeks but stayed at home because of their complaints. Therefore, the UBOS may not be the questionnaire best suited to these participants,

Table I. Demographic data, and data the two conditions in relation to work, sick leave, seasonality score and season of participation.

	Treatment ( $n = 16$ )	Control ( $n = 14$ )
Male/Female	8/8	8/6
Age**	44.6 ± 10.8 years	45.9 ± 13.0 years
Sick leave	12	12
Partial sick leave	3	2
Full at work	1	
Hours at work*	13 ( $n = 4$ )	14 ( $n = 2$ )
Education Level	—	—
Low	1	—
Middle	6	8
High	9	6
Global Seasonality Score (SPAQ)**	6.2 ± 3.8	8.5 ± 6.2
Winter/Summer	6/10	4/10

\* Average working hours per week of participant who are still (partial) at work.

\*\* Mean score ± standard deviation.

Table II. Light treatment versus waiting list condition (control).

	Before*	Day 1*	Day 8*	Day 15*	Day 22*	Per cent improvement	Effect size	F (1,3)	p level
UBOS emotional exhaustion	Treatment 4.85 ± 1.08	4.68 ± 1.15	4.52 ± 1.22	4.39 ± 1.22	4.07 ± 1.17	13.0	0.53	2.45	0.09
	Control 4.70 ± 1.03	4.66 ± 1.06	4.67 ± 0.98	4.79 ± 1.04	4.76 ± 0.92	-2.2	-0.1		
UBOS depersonalization	Treatment 3.05 ± 1.89	3.10 ± 1.67	3.05 ± 1.72	3.22 ± 1.61	3.02 ± 1.73	2.6	0.05	2.75	0.06
	Control 2.73 ± 1.70	2.77 ± 1.29	3.30 ± 1.14	3.29 ± 1.46	3.64 ± 1.44	-31.4	-0.55		
UBOS lack of professional accomplishment	Treatment 3.93 ± 1.32	3.97 ± 1.4	3.96 ± 1.22	3.93 ± 1.26	3.79 ± 1.17	4.53	0	0.65	0.59
	Control 3.36 ± 1.45	3.45 ± 1.32	3.37 ± 1.40	3.31 ± 1.43	3.36 ± 1.36	2.6	0.07		
BO-NKS	Treatment 39.4 ± 12.2	39.4 ± 11.6	32.3 ± 13.8	30.0 ± 15.6	26.6 ± 15.8	32.5	0.92	3.98	0.02
	Control 39.1 ± 14.1	42.6 ± 13.6	41.3 ± 13.5	42.4 ± 15.5	40.9 ± 11.9	4.0	0.13		
SFQ	Treatment —	24.4 ± 2.9	21.4 ± 4.7	19.5 ± 5.2	18.0 ± 5.5	26.2	1.46	3.66	0.03
	Control —	24.5 ± 3.3	23.8 ± 3.3	23.6 ± 4.1	24.1 ± 3.2	1.6	0.12		
BDI-II total score	Treatment 20.2 ± 8.20	19.3 ± 7.0	15.3 ± 6.9	13.3 ± 7.9	11.4 ± 7.4	41.0	1.1	2.4	0.09
	Control 20.6 ± 6.10	20.4 ± 7.7	18.9 ± 6.8	19.9 ± 9.6	18.0 ± 7.7	11.8	0.31		
BDI-II item 1 (depressive mood)	Treatment 0.63 ± 0.72	0.44 ± 0.63	0.19 ± 0.40	0.31 ± 0.60	0.31 ± 0.6	29.5	0.21	1.18	0.34
	Control 0.36 ± 0.50	0.29 ± 0.47	0.36 ± 0.50	0.29 ± 0.47	0.21 ± 0.43	27.5	1.78		
BDI-II item 15 (fatigue)	Treatment 2.00 ± 0.63	1.94 ± 0.58	1.47 ± 0.64	1.25 ± 0.58	1.19 ± 0.75	38.7	1.12	2.79	0.06
	Control 1.96 ± 0.48	1.86 ± 0.54	1.79 ± 0.43	1.93 ± 0.62	1.71 ± 0.61	11.8	0.26		
BDI-II item 16 (changes in sleeping patterns)	Treatment 1.31 ± 0.8	1.25 ± 0.68	1.19 ± 0.91	0.31 ± 0.48	0.56 ± 0.51	55.2	1.15	4.48	0.012
	Control 1.57 ± 0.65	1.5 ± 0.65	1.43 ± 0.76	1.07 ± 0.92	1.43 ± 0.76	4.7	0.1		
BDI-II item 20 (energy)	Treatment 1.81 ± 0.91	1.75 ± 0.68	1.31 ± 0.79	1.13 ± 0.59	0.81 ± 0.75	53.7	1.31	2.23	0.11
	Control 1.71 ± 0.61	1.79 ± 0.70	1.64 ± 0.75	1.71 ± 0.61	1.64 ± 0.84	8.5	0.19		

Results are based on weekly self-ratings.  
\* mean scores ± standard deviation.



which might explain why the results based on this questionnaire are weaker than those based on the other instruments.

When comparing the participants of this study to those of other studies (Ahola et al., 2005), they were seen to have somewhat depressive symptoms. We excluded patients with a DSM-IV diagnosis of depression from the study. Nevertheless, participants in both conditions would seem to have depressive complaints as assessed by means of the BDI-II. After light treatment, the trend towards improvement based on the BDI-II scores can be explained by the items about fatigue and energy. The item about depressed mood did not change after light treatment. The scores on this item were low from the beginning.

Although energy levels in the light treatment condition improved, it is unclear if exposure to light boosts these energy levels directly. Changes in sleep patterns in the treatment condition improved significantly when compared to the control group when looking at the score on item 16 of the BDI-II-NL. Sonnenschein, Sorbi, Van Doornen, Schaufeli, and Maas (2007a) showed that impaired sleep complicated the improvement of burnout complaints independently of depressive mood. If people do not benefit from sleep, this is a symptom of energy depletion. It is conceivable that improving sleep patterns may lead to a boost in the energy levels. Sleep patterns can improve after light treatment, but also after a regular sleep-wake pattern induced by the research protocol. Sleep patterns were still improved a week after the light treatment had ended.

Apart from the small sample size, another limitation of this study is its lack of a placebo-controlled condition. A waiting list condition followed by light treatment was used instead. When we look at the results of the treatment that was offered after the waiting list period, there was no difference in results after this type of light treatment as compared to the light treatment of the protocol: the participants of the waiting list condition showed the same degree of improvement. Some effects of expectations about the result of the treatment cannot be ruled out, however. Also, the effects of the daily visits, and contacts with the clinical staff, might account for some of the observed improvements, although the staff was instructed not to talk about the participants' complaints. In the control condition, there were no daily visits to the clinic.

In spite of these shortcomings, the preliminary results of light treatment are promising when

treating the emotional exhaustion of the burnout syndrome.

Notwithstanding the small sample size, the effect sizes of light treatment according to the self-rating questionnaires are promising. Further research is, therefore, needed.

If light treatment has in fact a positive effect on emotional exhaustion, it may be assumed that patients can benefit more readily from that treatment if light treatment is administered prior to any other treatment.

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