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# Mediators of Change in Cognitive Behavior Therapy for Clinical Burnout

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**Evidence supporting the effectiveness of cognitive behavior therapy (CBT) for stress-related illness is growing, but little is known about its mechanisms of change. The aim of this study was to investigate potential mediators of CBT for severe stress in form of clinical burnout, using an active psychological treatment as comparator. We used linear mixed models to analyze data from patients ($N$ = 82) with clinical burnout who received either CBT or another psychological treatment in a randomized controlled trial. Potential mediators (i.e., sleep quality, behavioral activation, perceived competence, and therapeutic alliance) and outcome (i.e., symptoms of burnout) were assessed weekly during treatment. The results showed that the positive treatment effects on symptoms of burnout favoring CBT (estimated between-group $d$ = 0.93) were mediated by improvements in sleep quality, $ab$ = -0.017, 95% $CI_{asymmetric}$ [-0.037, -0.002], and increase in perceived competence, $ab$ = -0.037, 95% $CI_{asymmetric}$ [-0.070, -0.010]. Behavioral activation, $ab$ = -0.004 [-0.016, 0.007], and therapeutic alliance, $ab$ = 0.002 [-0.006, 0.011], did not significantly mediate the difference in effects between the treatments. Improving sleep quality and increasing**

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**perceived competence may thus constitute important process goals in order to attain symptom reduction in CBT for clinical burnout.**

*Keywords:* clinical burnout; cognitive behavior therapy; exhaustion disorder; mediation

Prolonged exposure to nontraumatic stressors (such as high workload, divorce, interpersonal conflict and socioeconomic difficulties) without sufficient recovery can result in a wide range of symptoms. Burnout has been used to refer to the end-stage of a stress process, an adaptive breakdown, with increasing difficulties to cope (Schaufeli, Leiter, & Maslach, 2009). Although burnout has been defined in different ways (see e.g., Schaufeli et al., 2009), exhaustion is viewed as a core component in most definitions of the construct (Maslach & Leiter, 2016). Chronic exposure to work and/or life stress can deplete an individual's energy resources and lead to physical, emotional, and cognitive exhaustion (Melamed et al., 1999; Shirom & Ezrachi, 2003).

A distinction can be made between "mild burnout" and "clinical burnout," where the latter constitutes a condition with severe symptoms, including emotional exhaustion, physical fatigue, cognitive impairments, disturbed sleep, and functional impairment (Grossi, Perski, Osika, & Savic, 2015; Schaufeli, Bakker, Hoogduin, Schaap, & Kladler, 2001). In a few European countries, such as Sweden and the Netherlands, clinical burnout has been operationalized for use as a formal diagnosis with extreme exhaustion and fatigue as key features (Schaufeli et al., 2009). A combination of stressors related to both work (e.g., quantitative and emotional demands) and nonwork (e.g., relational problems, financial worries) often contributes to the onset of clinical burnout (Hasselberg, Jonsdottir, Ellbin, & Skagert, 2014). The course of symptoms seems to be persistent over time (Melamed, Shirom, Toker, Berliner, & Shapira, 2006). Clinical burnout frequently co-occurs with sleep disturbances as well as depression and/or anxiety disorders (Grossi et al., 2015). However, although clinical burnout often overlaps with low mood, it has distinct features and can exist with or without concurrent depression (Beser et al., 2014). Prospective studies have shown clinical burnout to be a risk factor for somatic diseases, e.g., cardiovascular disease and type 2 diabetes (Melamed, Shirom, Toker, Berliner, et al., 2006; Melamed, Shirom, Toker, & Shapira, 2006). Further, clinical burnout is related to reduced ability to work (Hasselberg et al., 2014). Survey studies indicate an estimated prevalence of clinical burnout to 3%– 7% (Glise, Hadzibajramovic, Jonsdottir, & Ahlborg, 2010; Persson, Osterberg, Viborg, Jonsson, & Tenenbaum, 2016).

Cognitive behavior therapy (CBT) shows promising results for occupational stress (Richardson & Rothstein, 2008), but there is still substantial uncertainty regarding its effects for clinical burnout. Treatments for clinical burnout are markedly understudied. A recent meta-analysis of tertiary psychological interventions for clinical burnout included eight studies, of which four were CBT-based, and concluded that treatments had significant effects on sickness absence, but not on symptoms of exhaustion (Perski, Grossi, Perski, & Niemi, 2017). We have recently shown CBT to result in superior reductions in symptoms compared to another active psychological treatment in patients with common mental disorders, a majority having clinical burnout as their primary disorder (Salomonsson et al., 2017). One major limitation in the current body of knowledge is that the mechanisms of change in CBT for stress-related illness, as well as for other psychiatric disorders, are poorly understood (Kazdin, 2007). This is the focus of the present article. A mechanism of change is the causal intermediate process through which a treatment achieves its effect on the outcome. A mediator is a variable that statistically explains the relationship between an independent variable (e.g., CBT) and a dependent variable (e.g., symptom reduction). Thus, the study of mediators is often a first step in understanding mechanisms (Kazdin, 2007). Importantly, this information can be used both to understand the processes that maintain a disorder and to improve treatments (Kraemer, Wilson, Fairburn, & Agras, 2002). To our knowledge, no studies have investigated mediators in CBT for clinical burnout. In the following, four putative mediators that might play an important role in CBT for clinical burnout are discussed.

Sleep is a central source of recovery, and disturbance or deprivation of sleep is often associated with changes in the activity of the neuroendocrine stress systems (Meerlo, Sgoifo, & Suchecki, 2008). Further, sleep disturbance (e.g., insomnia or sleep fragmentation) is a central feature of clinical burnout (Ekstedt et al., 2006; Grossi et al., 2015) and insufficient sleep may predict future burnout (Armon, Shirom, Shapira, & Melamed, 2008; Söderstrom, Jeding, Ekstedt, Perski, & Akerstedt, 2012). Consequently, improved sleep quality is a possible mediator of change in CBT for clinical burnout.

Aside from sleep, various activities and behaviors may have a restorative function. In line with the role of behavioral activation in treating depression

(Addis & Martell, 2004; Lejuez, Hopko, Acierno, Daughters, & Pagoto, 2011), the behavioral repertoire of individuals with clinical burnout is often affected, resulting in an imbalance between arousal and recuperation. For example, spending a significant amount of time in ruminating on work may cause stress and limit energy to engage in valued social behaviors and physical exercise. Increasing activation, especially positively reinforcing behaviors and behaviors with a restorative function, could be an important mediator of change in CBT for clinical burnout.

A third possible mediator of change is perceived competence. This refers to the individual's beliefs about his or her ability, specifically, feeling able to effectively perform towards personally valued goals (Deci & Ryan, 2000). Here, perceived competence refers to the belief in the ability to cope with the clinical burnout. Perceived competence is close in meaning to the construct of self-efficacy (Bandura, 1977), which refers to an individual's expectations about the ability to effectively cope and consequently initiating coping behaviors. Even though both constructs involve promoting motivation for action towards goals, perceived competence is in addition conceptualized as a basic psychological need that is related to well-being and mental health on its own (Deci & Ryan, 2000). Perceived competence has been shown to be associated with several positive health outcomes, both mental and physical (Ng et al., 2012). Therapists can enhance perceived competence by, for example, providing the patient with positive feedback about effective coping, provide meaningful rationales for proposed changes, and encourage goals that are valued by the patient (Ryan & Deci, 2008). CBT could be particularly apt in enhancing these competence-supporting strategies.

There is evidence that common factors, components common to all psychotherapies, are important to enable therapeutic change (Wampold, 2015). One such common factor is therapeutic alliance, which refers to the working collaboration between the patient and the therapist. Therapeutic alliance concerns both the bond between patient and therapist, and the level of agreement on important goals and tasks in treatment. Therapeutic alliance could influence outcome in treatment either directly (alliance having a therapeutic effect in itself) or indirectly (alliance enabling the patient to involve in activities in therapy that are beneficial; Horvath, 2006). How patients perceive the therapeutic alliance is thus relevant to investigate as a mediator of change also in the present trial.

In sum, treatments for clinical burnout are understudied and there is a clear lack of knowledge concerning the processes through which potential change occur. In a mixed sample of common mental disorders, predominantly consisting of clinical burnout, we have recently shown superior symptom reduction for CBT (Salomonsson et al., 2017). The aim of the present study was to investigate potential mediators of change for patients with clinical burnout receiving CBT, compared to another psychological treatment. Gaining more such knowledge could ultimately lead to more effective treatments. Investigated mediators were sleep quality, behavioral activation, perceived competence, and therapeutic alliance. We analyzed if CBT, relative to another active psychological treatment, influenced these potential mediators more (the so called "a-path"), if changes in the mediators predicted reductions in burnout (the so called "b-path"), and whether the final mediated effect was significant (the *ab*-product). No hypotheses were formulated regarding the mediation due to the limited amount of prior empirical research in this area.

## Method

### DESIGN

Patients in the present study participated in a randomized controlled trial for patients on sick leave due to exhaustion disorder (equivalent to clinical burnout, explained below), adjustment disorder, anxiety disorder, depression, or insomnia (Salomonsson et al., 2017). The original study comprised 211 patients, randomized to one of three conditions: CBT, a return-to-work intervention (RTW-I), or a combination of the two. Randomization sequences, stratified for each primary care unit, were generated by an independent researcher using a random number generator, Research Randomizer (https://www.randomizer.org/). Treatment conditions were written on cards and placed in opaque envelopes according to the randomization sequence. The original study had two primary outcomes: psychiatric symptom severity on principal diagnosis and sick leave. Symptom severity was assessed in blind diagnostic interviews on the 0–8 scale of the Clinician's Severity Rating (CSR; Di Nardo, Moras, Barlow, Rapee, & Brown, 1993). Information regarding sick leave was obtained from registry data. Main findings were that all treatments were associated with large reductions in symptoms according to the CSR and that CBT led to significantly larger improvements than RTW-I. No differences between groups were found regarding sick leave (Salomonsson et al.). Among patients in the trial, 125 were treated for a principal diagnosis of exhaustion disorder (clinical burnout). For the purpose of the present study, the 82 patients randomized to CBT ($n = 40$) or RTW-I ($n = 42$) were analyzed. Potential mediators

and treatment outcome were assessed on a weekly basis and therefore allowed us to evaluate if change in a mediator was associated with subsequent change in outcome. The randomized trial was approved by the regional ethics review board in Stockholm and all patients provided informed consent.

### RECRUITMENT, TREATMENT CONTEXT AND PATIENTS

Patients were recruited consecutively from four primary care clinics in Stockholm, Sweden. Assessment and treatment, conducted by licensed psychologists, took place at the four clinics within a regular primary care context. Assessment included a structured psychiatric interview using the Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) with additional criteria to assess clinical burnout, as operationalized by the formal diagnosis of exhaustion disorder in the Swedish version of the International Classification of Diseases tenth revision (ICD-10; ICD-code 43.8; The Swedish National Board of Health and Welfare, 2003). Diagnostic criteria for exhaustion disorder are symptoms of psychological and physical exhaustion for at least 2 weeks, developed as a consequence of identifiable stressors present for at least 6 months. A significant lack of psychological energy dominates the picture, paired with disturbed concentration or memory, decreased ability to cope with demands, emotional instability, sleep disturbance, substantial physical weakness and physical symptoms such as ache, palpitation, dizziness, or sensitivity to sound. Symptoms should cause clinically significant suffering or impairment (Beser et al., 2014; The Swedish National Board of Health and Welfare, 2003). The licensed psychologists all had CBT training, and also received additional training in assessment of exhaustion disorder and in the treatment protocols used. Patients received no financial compensation for participating.

The sample ($N$ = 82) consisted of 69 women (84.1%) and 13 men (15.9%). The mean age was 43.7 years ($SD$ = 9.5). For inclusion in the present study, patients had to have a principal diagnosis of exhaustion disorder. A majority of patients, 47 of 82 (57.3%), also fulfilled criteria for at least one comorbid disorder: 27 patients (32.9%) had one additional disorder, 17 patients (20.7%) had two comorbid disorders and three patients (3.7%) had three comorbid disorders. Table 1 displays characteristics of patients at baseline for each condition.

Table 1
Patient Characteristics of Both Groups at Pretreatment

| Variable | CBT ($n$ = 40) | RTW-I ($n$ = 42) |
|---|---|---|
| Women, $n$ (%) | 34 (85.0) | 35 (83.3) |
| Age, mean ($SD$) | 43.2 (9.7) | 44.1 (9.4) |
| Clinical burnout (exhaustion disorder) | | |
| Duration: years, mean ($SD$) | 2.2 (3.8) | 2.5 (4.8) |
| Age at onset: years, mean ($SD$) | 40.1 (12.1) | 40.6 (10.1) |
| Comorbid disorders [a] | | |
| Depression, $n$ (%) | 12 (30.0) | 14 (33.3) |
| Insomnia, $n$ (%) | 7 (17.5) | 11 (26.2) |
| Generalized anxiety disorder, $n$ (%) | 7 (17.5) | 7 (16.7) |
| Social anxiety disorder, $n$ (%) | 4 (10) | 1 (2.4) |
| Specific phobia, $n$ (%) | 3 (7.5) | 1 (2.4) |
| Panic disorder, $n$ (%) | 2 (5.0) | 0 (0) |
| Obsessive-compulsive disorder, $n$ (%) | 0 (0) | 1 (2.4) |
| Education, highest finished, $n$ (%) | | |
| College/University ≥ 3 years | 16 (40.0) | 24 (57.1) |
| College/University < 3 years | 10 (25.0) | 5 (11.9) |
| Secondary school 2-3 years | 11 (27.5) | 10 (23.8) |
| Compulsory school 9 years | 3 (7.5) | 3 (7.1) |

*Note.* CBT = cognitive behavior therapy; RTW-I = return-to-work intervention.
[a] Some patients fulfilled criteria for more than one comorbid disorder, the total percentage of comorbid disorders could thus exceed 100% per condition.

### TREATMENTS

#### *Cognitive Behavior Therapy (CBT)*

As no evidence-based treatments exist for clinical burnout, we used a cognitive behavioral treatment developed by our research group (Salomonsson et al., 2017). The treatment builds on the key assumption that deficits in recovery is a central cause and maintaining factor for the negative effects of exposure to prolonged stress (Geurts & Sonnentag, 2006). Recovery refers to psychophysiological relaxation and is achieved through both active behaviors and from the restoration that results from sleep (Söderstrom et al., 2012). Psychoeducation about symptoms of stress and burnout, and the importance of recovery, is a starting point for the treatment. Patients are taught a brief relaxation exercise based on breathing. Further, behavioral activation is a vital part of treatment, including all the active ingredients according to the model by Lejuez et al. (2011), i.e., monitoring of activities and mood states, identification of values and specific activities in accordance with values, prioritizing among activities, activity scheduling, and evaluation of emotional consequences of new behaviors as well as obstacles. Specific focus is placed on activities that serve a recuperating function. The treatment is also based on the assumption that patients with clinical burnout frequently engage in behaviors that serve to reduce negative emotional states in the short term. For

example, fulfilling one's own needs might be associated with feelings of guilt and anxiety, resulting in low priority to time spent on recuperative activities. Functional analysis of emotion-evoking situations and exposure of earlier avoided stimuli are therefore included in the protocol. The treatment also includes optional components that are used by the end of treatment if the treating psychologist deems them as helpful for the patient. These components consist of strategies for enhanced sleep quality (e.g., scheduling sleep, limiting time in bed, increasing exposure to daytime light), communication skills and identification of dysfunctional assumptions (e.g., concerning unrealistic performance standards). Table S1 (online supplement) displays an overview of the content of each session. The CBT was scheduled for 9 to 13 weekly individual sessions, each 45 minutes. Cancelled sessions, (e.g., due to illness or vacation) were postponed to the following week and the treatment period was prolonged accordingly. Consequently, for many patients treatment duration in weeks exceeded number of sessions.

*Return-to-Work Intervention (RTW-I)*

RTW-I is a psychological intervention that aims to help patients on sick leave due to psychiatric problems return to a sustainable work situation (Salomonsson et al., 2017). The manual was developed by our research group based on previous research in the field that suggests that return-to-work issues should be addressed early in treatment, that communication with the employer is vital, and that gradual exposure to the work situation is recommended (see e.g., Hoefsmit, Houkes, & Nijhuis, 2012; van der Klink, Blonk, Schene, & van Dijk, 2003). RTW-I consists of four key modules: (a) conceptualization, (b) psychoeducation, (c) planning, and (d) monitoring. Conceptualization aims at analyzing the patient's work situation, reasons for sick leave, obstacles for returning to work, and long-term work goals. In the conceptualization phase the therapist collects information from the employer. Psychoeducation concerns both information about the rules and guidelines regarding sick leave as well as CBT-based principles about behavioral activation, exposure, the importance of recovery while under stress, strategies for improved sleep, and problem solving. However, in contrast to the CBT condition, the CBT-principles in RTW-I are not followed up in any structured way. Rather, they are used flexibly during treatment to facilitate return to work. For example, behavioral activation in the RTW-I includes brief psychoeducation in session and a two-page written summary about the association between activity level and mood. This information aims to increase activation, specifically in motivating steps towards return to work. However, the behavioral activation component in RTW-I does not include any of the active ingredients described above for the CBT condition. Planning consists of therapist and patient formulating a concrete plan of the steps towards returning to work, and this plan is then communicated to other key parties involved (i.e., employer, general practitioner, and administrator from the health insurance office). Monitoring consists of supporting the patient in following the plan, making adjustments and problem solving when needed. Table S1 (online supplement) displays an overview of the session-by-session content. The RTW-I was scheduled for 10 individual sessions. The treatment was planned to finish within 20 weeks, but exceptions were allowed as for the CBT condition. Within the treatment period, sessions were spaced as best suited for the individual patient, to optimize helpfulness in the process of returning to work. RTW-I was thus a well-defined psychological treatment that in the present study controlled for engaging in systematic behavior change, receiving support from a therapist, and likely, also expectancy of improvement.

## ASSESSMENT OF MEDIATORS AND OUTCOME

*Assessment Points*

The self-reported outcome measure was assessed weekly during treatment and at posttreatment. The self-reported process measures (i.e., the putative mediators) were assessed at pretreatment and weekly during treatment.

*Outcome Measure*

The Shirom–Melamed Burnout Questionnaire (SMBQ; Melamed, Kushnir, & Shirom, 1992) was used to assess level of burnout throughout treatment. The SMBQ consists of 22 items, scored 1–7. It measures different facets of burnout and consists of four subscales covering "emotional exhaustion and physical fatigue," "cognitive weariness," "tension," and "listlessness" (Melamed et al., 1999). For the purpose of this article, the global score (the average of all items) was used, as it covers the construct of burnout as mainly defined by various symptoms of exhaustion. Item examples are "I feel physically exhausted," "My batteries are dead," and "My head is not clear." Although not originally designed as a diagnostic tool, a score above 4.4 has been shown to separate cases of clinical burnout from the normal population (Lundgren-Nilsson, Jonsdottir, Pallant, & Ahlborg, 2012). This cutoff was not used in the present study, but can serve as a reference point for the results. The SMBQ has shown high correlation with other measures of

burnout, $r$ = .77–.87 (Grossi, Perski, Evengård, Blomkvist, & Orth-Gomér, 2003). In the present sample, the internal consistency, Cronbach's α, for the SMBQ was .94.

*Process Measures*

The Insomnia Severity Index (ISI; Bastien, Vallieres, & Morin, 2001; Morin, 1993) is a 7-item scale measuring sleep disturbance. Each item is graded 0–4 with a total maximum score of 28. The ISI has shown satisfactory psychometric properties with acceptable internal consistency (Cronbach's α = .74–.78), good convergence with clinician's evaluation of sleep disturbance severity ($r$ = .57–.71), and sensitivity to detect changes related to treatment (Bastien et al., 2001). In the present sample, the internal consistency for the ISI was .90.

The Behavioral Activation for Depression Scale (BADS; Kanter, Mulick, Busch, Berlin, & Martell, 2006) was used to assess level of activation. The scale was originally developed to assess central constructs in the behavioral activation treatment for depression. The activation subscale, BADS-A, was used to assess goal-directed activation. The BADS-A consists of 7 items, graded 0–6, with a total maximum score of 42. The BADS-A has demonstrated good internal consistency, Cronbach's α = .85–.87 (Kanter et al., 2006). In the present sample, the internal consistency for the BADS-A was .83.

The Perceived Competence Scale (PCS; Williams et al., 2006; Williams, Wiener, Markakis, Reeve, & Deci, 1994) is a 4-item scale measuring belief in the ability to cope with a specified problem, that is, burnout in the present study. Each item is graded on a 1–7 Likert scale, with a total score as an average of the four items. The PCS has shown good internal consistency previously (Cronbach's α = .83–.86; Williams, McGregor, Zeldman, Freedman, & Deci, 2004). In the present sample, the internal consistency for the PCS was .75.

The Working Alliance Inventory (WAI; Horvath & Greenberg, 1986; Horvath & Greenberg, 1989) was used to assess therapeutic alliance. The 12-item short form of the WAI (Tracey & Kokotovic, 1989) was used and is graded 1–7 on each item with a total maximum score of 84. The 12-item WAI has shown similar psychometric properties as the original version of the scale (Tracey & Kokotovic, 1989), which has demonstrated both good internal consistency (Cronbach's α = .93) and convergent validity (Horvath & Greenberg, 1989). In the present sample, the internal consistency for the WAI was .91.

All scales were administered in Swedish. For SMBQ, ISI and WAI translated versions that have been used in prior research (Andersson et al., 2012; Hedman et al., 2013; Lundgren-Nilsson et al., 2012) were available. PCS and BADS-A were translated by our research group. One researcher first drafted a translation, which was then independently reviewed by two researchers. Incongruences were resolved in discussion. In the present sample, internal consistencies for the scales were acceptable to excellent (Cronbach's α = .75–.94). An instruction to evaluate the last week when answering the questions was added to scales that did not include such an instruction (i.e., SMBQ, ISI, PCS and WAI). This was done to prompt the patient to consider every week in isolation, because the assessments were conducted weekly during the treatment period.

## STATISTICAL ANALYSES

Statistical analyses were conducted using SPSS version 22.0.0 (SPSS inc., Chicago). To model change over time, we used linear mixed effects modeling (Hesser, 2015). We used a moderated mediation model where we investigated whether the effect of time on the mediator differed as a function of treatment, and if the mediator was associated with the outcome. We also explored whether the association between mediator and outcome differed as a function of treatment (Kraemer et al., 2002). Mixed effects models incorporate both fixed effects (i.e., average effects over individuals) and random effects (i.e., individual intercepts and slopes). The model included two levels. Level 1 consisted of the within individual variables (i.e., time, mediator and outcome) and modeled change over time irrespective of treatment condition. Level 2 incorporated the between individual variable (i.e., treatment condition). By combining these two levels it is possible to investigate moderated mediation, that is, whether trajectories between time, mediator, and outcome vary as a function of treatment allocation. Thus, the model is best described as a lower-level mediation model with a moderator variable included at level 2 (i.e., treatment) (Bauer, Preacher, & Gil, 2006; Kenny, Korchmaros, & Bolger, 2003). The combined model, including both level 1 and 2, was specified by Eqs. (1) and (2),

$$M_{ij} = d_{0Mj} + d_{1Mj}(\mathrm{Time}_{ij}) + d_{2Mj}(\mathrm{Tx}_j) + a_j(\mathrm{Time}_{ij})(\mathrm{Tx}_j) + e_{Mij} \quad (1)$$

$$Y_{ij} = d_{0Yj} + d_{1Yj}(\mathrm{Time}_{ij}) + d_{2Yj}(\mathrm{Tx}_j) + b_j M_{ij} + c'_j(\mathrm{Time}_{ij})(\mathrm{Tx}_j) + e_{Yij} \quad (2)$$

where M is the putative mediator (ISI, BADS-A, PCS or WAI) and Y is the outcome (SMBQ). The subscript $i$ represents the respective repeated

assessment, and the subscript *j* represents the individual. Intercepts in the two equations are represented by $d_{0Mj}$ and $d_{0Yj}$. The average linear slopes for the RTW-I (i.e., RTW-I was coded as 0 in the binary treatment variable) are represented by $d_{1Mj}$ and $d_{1Yj}$. The mean differences between the treatment conditions in intercept are represented by $d_{2Mj}$ and $d_{2Yj}$. The $a_j$ coefficient represents the a-path, the difference in linear change trajectory between the treatment conditions on the mediator. The $b_j$ coefficient represents the b-path, the time-lagged association between the mediator and the outcome. The $c'_j$ coefficient represents the direct effect, i.e., the difference in linear change trajectory between the treatment conditions on the outcome, when controlling for the effect of the mediators. The intercepts and slopes were allowed to be random.

Model building was performed in steps (see e.g., Hesser, 2015) and the final model was analytically determined by comparing nested models using the likelihood ratio test. First, we decided on the functional form of change and the number of random effects (with associated covariance structure) needed to capture individual growth over time. Second, we modified the residual variance by comparing different error covariance structures (i.e., identity, diagonal, autoregressive). Finally, we included treatment condition as a fixed predictor at level 2 with associated cross-level interaction terms (i.e., main effect, treatment condition by time, treatment condition by mediator interactions). The best-fitted model was a linear model with random effects for intercept and slope and an autoregressive covariance structure for error terms.

In addition, we used analysis of covariance (ANCOVA) to evaluate if sites (four primary care units), therapists (14 psychologists conducting treatment), and comorbidities (depression, insomnia, depression and insomnia, or none of these) had significant effects on the outcome (SMBQ) and therefore should be considered for inclusion in final models.

Figure 1 displays the complete moderated mediation model. When testing for interaction effects, treatment yielded a significant interaction regarding the a- and c-path. However, no significant interaction was found for the b-path, and therefore this interaction was omitted from the final model and further analyses.

To determine the indirect effect, the product of coefficient approach was used (MacKinnon, Fairchild, & Fritz, 2007). That is, the a-path coefficient was multiplied with the b-path coefficient. Given that the sampling distribution of the product of two normal random variables is rarely normally distributed, significance of the indirect effect, i.e., the a × b product, was determined by the asymmetrical confidence interval, $CI_{asymmetric}$ (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). If the 95% CI does not contain zero, the mediated effect is statistically significantly different from zero at the specific alpha level (i.e., .05). This method, compared to the stepwise approach proposed by Baron and Kenny (1986), offers greater statistical power and limits the risk of type-1 errors (MacKinnon, 2008).

Overall, patients were assessed weekly: at baseline (Week 0), each week during treatment (Week 1 through a maximum of Week 25) and at posttreatment (the last weekly measure + 1 week). However, exact amount of days between measurements varied to some extent, as not all patients completed all assessments with 7 days intervals (despite being

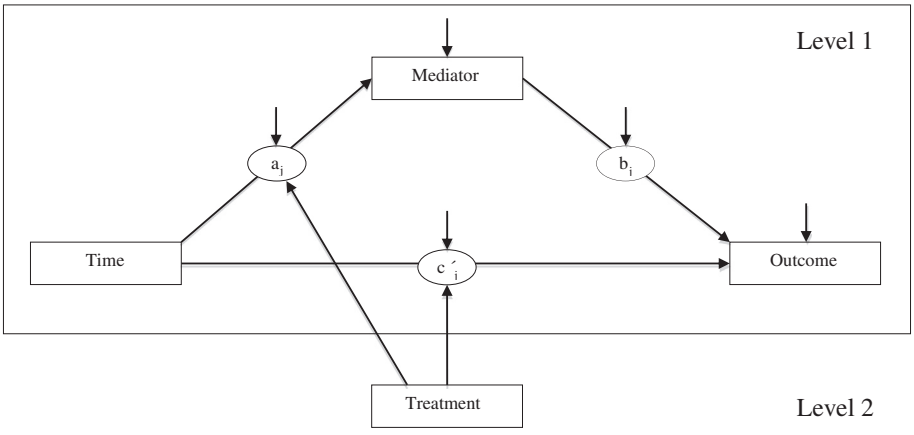


FIGURE 1 Illustration of the moderated mediation model. The boxes indicate observed variables. Time, mediator and outcome are repeated within individual variables, measured at level 1. Treatment is a binary coded variable at level 2. Arrows from boxes indicate fixed effects. Arrows through circles indicate time-varying effects, including random effects. Vertical arrows represent residuals.

asked to do so). Also, the duration of treatment varied between patients. Due to these factors, we used time-varying coding of observations and effects were modeled in relation to time instead of session, as has been suggested when number and frequency of sessions vary across patients (Tasca & Gallop, 2009). Time point for a measurement was calculated as number of days from baseline (time 0), and then converted to months (e.g., 7 days from baseline was coded as 0.23 months) so that a- and c-path estimates reflect difference between treatments in change per month. For the mediators, assessment points from Week 0 through Week 25 were included. For estimation of the time-lagged effect of mediator on outcome, assessment points from Week 1 through posttreatment were used for the outcome. By doing so, the effect of the mediator (at time point $i$ - 1) was modeled on the outcome the subsequent week (at time point $i$). In all analyses we employed restricted maximum likelihood estimation. This means that all available data were used to estimate model parameters. This method returns unbiased estimates and standard errors under a fairly lenient missing data assumption, which is formally known as missing at random (Enders, 2011).

We estimated between-group effect sizes and confidence intervals for outcome and mediators based on methods suggested by Feingold (2015). For effect size estimation, the beta coefficient (difference in change trajectories between treatments) was multiplied by treatment duration (the average treatment duration of 4.7 months was used), and then divided by the pooled *SD* of observed values at baseline. Sampling variances (i.e., SE) for *d* were calculated using the standard errors of the unstandardized beta coefficients for the treatment by time interaction effect and the (pooled) SD at baseline following the alternative formula for CI estimation (Feingold, 2015; equation 10). We also estimated means and within-group effect sizes over time to aid in interpretation of when changes in mediators and outcome occurred. Estimations of means were calculated using the linear change trajectory (i.e., the beta-coefficient, expressed as change per month) for each treatment condition. Within-group effect sizes were calculated for each treatment by subtracting the monthly estimated mean value from the baseline value, and then dividing by the *SD* for the respective treatment condition at baseline.

## Results

### TREATMENT LENGTH, ATTRITION, ADHERENCE, AND MISSING DATA

Treatment length, counted as average number of weeks between pre- and postassessment, was longer for RTW-I ($M$ = 21.99, $SD$ = 5.11) than for CBT ($M$ = 18.48, $SD$ = 5.44), $t(74) = -2.92$, $p = .01$. The average number of sessions received was higher for patients in CBT ($M$ = 11.69, $SD$ = 1.06), than for RTW-I ($M$ = 9.71, $SD$ = 2.18), $t(79) = 5.14$, $p < .001$. One patient (2.5%) in the CBT condition and one patient (2.4%) in the RTW-I condition terminated treatment prematurely. According to assessment by the psychologist, 33 of 40 patients (82.5%) in CBT and 31 of 42 patients (73.8%) in RTW-I, completed treatment entirely according to plan. This difference was not statistically significant ($\chi^2 = 0.90$; $df = 1$; $p = .34$). The remaining patients, 6 of 40 patients (15.0%) in CBT and 10 of 42 patients (23.8%) in RTW-I, completed treatment to some extent according to assessment by the psychologist, also this a nonsignificant difference ($\chi^2 = 1.01$; $df = 1$; $p = .31$). In total, the patients completed 5,365 out of a total of 7,904 possible assessments yielding a 67.9% completion rate.

### CONSIDERATION OF POTENTIAL SITE AND THERAPIST EFFECTS

Results of ANCOVAs for SMBQ at posttreatment, holding pretreatment SMBQ values as covariates, revealed nonsignificant effects of site, $F(3, 73) = 2.45$, $p = .07$; therapist, $F(13, 73) = 1.04$, $p = .43$; and comorbidity, $F(3, 73) = 0.31$, $p = .82$. Consequently, we did not include these variables in further analyses.

### TREATMENT EFFECTS ON BURNOUT AND PUTATIVE MEDIATORS

#### *Individual Heterogeneity*

Table S2 (online supplement) displays the unconditional means model, that is, a mixed effects model including SMBQ values across patients and time points, without time and treatment condition included in the model. We calculated the Intraclass Correlation (ICC) as a measure of the dependence in the data (Hedeker & Gibbons, 2006). In the present analysis the ICC was 66.3%. Thus, considerable amount of variance in the outcome (SMBQ) could be explained by patients repeatedly being measured over time which motivated using random effects in further analyses.

#### *Change in Outcome Over Time*

The unconditional mixed effects model of change over time for SMBQ, as well as fit indices for the model, is presented in Table S3 (online supplement). As shown in the unconditional model, patients' SMBQ scores significantly decreased over time by 0.34 points per month, irrespective of treatment allocation. Further, there was significant individual heterogeneity in initial level and change trajectories

(*ps* < .001; see Table S3). There was no significant covariance between patients' initial levels and change trajectories.

*Change in Outcome Over Time as Function of Condition: C-Path*

As shown in the conditional model in Table S3 (online supplement), there was a significant interaction between time and treatment: mixed models analyses showed a significant difference in trajectories in favor of CBT, estimate = -0.18 (*SE* = 0.07), *p* = .01. That is, CBT decreased patients' SMBQ scores on average 0.18 more per month than RTW-I. The between-group effect size for SMBQ over the average treatment time, i.e., 4.7 months, was large and in favor of CBT (see Table S4, online supplement). As in the unconditional model, individual heterogeneity was significant (*ps* < .001; see Table S3) and covariance between patients' initial levels and change trajectories remained nonsignificant (see Table S3).

*Change in Putative Mediators Over Time: A-Path*

Analysis of the interaction of time and treatment for the a-path showed that CBT resulted in significantly larger improvement in sleep quality, estimate = -0.768 (*SE* = 0.345), *p* = .03, as well as in perceived competence, estimate = 0.248 (*SE* = 0.092), *p* = .01. That is, CBT decreased patients' ISI scores on average 0.768 more per month than RTW-I and increased patients' PCS scores on average 0.248 more per month than RTW-I. There were no differences in trajectories for behavioral activation, estimate = 0.346 (*SE* = 0.505), *p* = .50 or therapeutic alliance, estimate = 0.942 (*SE* = 0.503), *p* = .06. The results are displayed in Table 2. Between-group effect sizes for the average treatment time (i.e., 4.7 months) for mediators are displayed in Table S4 (online supplement). All effect sizes were in favor of CBT, and were large for perceived competence, moderate for sleep quality, and small for behavioral activation and therapeutic alliance.

*Association Between Putative Mediators and Outcome: B-Path*

As displayed in Table 2, the ISI, BADS-A, and PCS were significantly associated with SMBQ, when controlling for the effect of time * treatment, that is, the b-path for those mediators was significant. Thus across treatment conditions, there was an association between individual scores on these mediators at time *i* - 1 and scores on the outcome at time *i*. For illustration, an increase of one point on the PCS was associated with a decrease of 0.150 on the SMBQ the following week. There was no significant association between WAI and SMBQ. When the mediators with a significant b-path were included in the same model and controlling for the effect of time * treatment, the b-paths remained significant for all these three mediators, i.e., ISI, estimate = 0.025 (*SE* = 0.006), *p* < .001; BADS-A, estimate = -0.008 (*SE* = 0.004), *p* = .04; and PCS, estimate = -0.147 (*SE* = 0.029), *p* < .001. This indicates that each of these mediators contributed with unique predictive effects in the outcome SMBQ the following week. For descriptive purposes, Table S5 (online supplement) displays observed baseline values and estimates of means and within-group effect sizes per month for outcome and mediators over time, separated per treatment. Notably, the estimated within-group effects each month were larger for the outcome than for the mediators. For example, the effect size after 1 month of treatment in the CBT condition was moderate for symptoms of burnout, but small for sleep quality and perceived competence.

*The Mediated Effect: a × b Product*

Multiplying the a-path (i.e., the interaction effect of time and treatment) and the b-path (the time-lagged

Table 2
Multilevel Coefficients and the Asymmetric Confidence Interval Test for Mediation of Putative Mediators on Burnout as Function of Treatment

| Mediator | a (SE) | b (SE) | a ×b [95% CI [a]] |
|---|---|---|---|
| Sleep quality | -0.768 (0.345)* | 0.022 (0.006)*** | -0.017 [-0.037, -0.002] |
| Behavioral activation | 0.346 (0.505) | -0.010 (0.004)** | -0.004 [-0.016, 0.007] |
| Perceived competence | 0.248 (0.092)** | -0.150 (0.026)*** | -0.037 [-0.070, -0.010] |
| Therapeutic alliance | 0.942 (0.503) | 0.002 (0.004) | 0.002 [-0.006, 0.011] |

*Note.* Unstandardized coefficients are presented. a = interaction coefficient of time and treatment, i.e., difference in beta-coefficient, expressed as change per month, between conditions (0 = return-to-work intervention, 1 = cognitive behavior therapy); b = association between mediator and outcome (with one mediator per model), i.e., the main effect of mediator on outcome expressed as the effect of a one point increase in the mediator on the outcome the subsequent week; a × b = size of the mediated effect.
*p < .05; **p < .01; ***p < .001.
[a] The asymmetric confidence interval of the mediated effect, the mediated effect is considered statistically significant if the interval does not contain zero (MacKinnon et al., 2007).

main effect of the mediator on the outcome), using the asymmetrical confidence interval, resulted in a statistically significant product for sleep quality (ISI) and perceived competence (PCS). This means that the superior treatment effects of CBT relative to RTW-I were mediated by sleep quality and perceived competence. The remaining mediators did not result in a significant indirect effect. The results are displayed in Table 2.

## Discussion

The aim of this study was to investigate potential mediators of change in CBT for patients with clinical burnout. The results showed that the positive treatment effects on burnout favoring CBT relative to RTW-I were mediated by improved sleep quality and increased perceived competence. Neither behavioral activation nor therapeutic alliance was found to mediate the difference in effects between the treatments. Estimated between-group effect sizes were all in favor of CBT and large for burnout and perceived competence, moderate for sleep quality, and small for behavioral activation and therapeutic alliance.

Thus, some of the effect of CBT for clinical burnout seems to be mediated by improvements in sleep quality. There is substantial empirical evidence for the effectiveness of CBT for insomnia (Trauer, Qian, Doyle, Rajaratnam, & Cunnington, 2015) and empirically supported methods within CBT are stimulus control therapy, sleep restriction, paradoxical intention, and relaxation (Morin et al., 2006). However, the specific sleep strategies in CBT for clinical burnout as used in the present study (e.g., scheduling sleep and limiting time in bed) were introduced by the end of treatment, if implemented at all. Thus, the linear improvement in sleep quality cannot be attributed to these typical CBT strategies. Instead, other components of the treatment probably resulted in the sleep quality improvements. Behavioral changes in the CBT intervention aiming at increasing recovery, such as increasing recuperative activities, structuring the day and practice in relaxation, are more likely to have resulted in the improved nighttime sleep quality. Notably, relaxation was practiced in most sessions and patients were encouraged to use relaxation regularly in their everyday life. Although patients´ relaxation skills were not measured in this study, it is plausible that these skills improved and, at least in part, were responsible for the improved sleep quality. Notably, sleep disturbance is implicated as both causative and maintaining of clinical burnout (Grossi et al., 2015). In the present study, improved sleep quality correlated with subsequent improvements in burnout. Even though this does not imply causality, it seems plausible that the improvements in sleep quality caused by CBT in turn resulted in decreases in burnout.

The other significant mediator, perceived competence, refers to the belief in the ability to achieve personally valued goals (Deci & Ryan, 2000). An improved sense of competence both increases the likelihood for behavior change and is associated with well-being on its own (Williams et al., 2006). Patients receiving CBT significantly improved their perceived competence in coping with burnout compared to patients receiving RTW-I. CBT included thorough psychoeducation about burnout symptoms and their link to behavioral patterns such as lack of recovery, and how consequent suggestions about changes could reduce symptoms. Also, the CBT therapists were continuously focusing on new learning experiences, effective coping and changes in line with the patient's goals, resulting in positive feedback both naturally in the situation where the behavior occurred, and afterwards in session. In sum, it seems plausible that several components of CBT were linked to the increase in perceived competence. The improvement in perceived competence was in turn associated with a subsequent reduction in symptoms of burnout. This adds to earlier data showing support for associations between perceived competence and mental health, such as decreased depression and anxiety (Ng et al., 2012). Whether the improvements in perceived competence in the present study directly influenced symptoms of burnout, or if perceived competence in turn resulted in behavior changes that influenced the symptoms, cannot be determined by this study. Nevertheless, perceived competence may be an important process to target in CBT for clinical burnout.

It should be noted that although we found sleep quality and perceived competence to be significant mediators of change, we could also see that monthly estimated within-group effect sizes were larger for the outcome than for the mediators. This could suggest that the proposed mediators did not drive changes in burnout. However, it could also signify that relatively smaller changes in the mediators have important impact on changes in burnout. It is also important to note that these changes reflect averages that may not accurately account for the changes that occur at the individual level. Indeed, our data analytic model was set up to test whether the mediator predicted *subsequent* scores on the outcome by including the mediator as a lagged time-varying predictor at the within-person level (i.e., level 1). Still, other more advanced models that explicitly aim to examine the extent to which two variables influence each other over time

by separating the within-person processes from the between-person differences could shed more light on the issue of causal predominance at the individual level (Hamaker, Kuiper, & Grasman, 2015). In this context, it should also be noted that statistical analyses of mediators are often seen as exploratory and hypothesis-generating devices (Kraemer et al., 2002). From such a perspective, our results are correlational and are only indicative of a potential causal structure that needs to be confirmed in experiments.

Regarding behavioral activation as putative mediator, a central focus in the investigated CBT for clinical burnout was helping patients to increase their behaviors in valued direction. This was conducted through identification of values and setting step-by-step behavioral goals in moving towards these values, in accordance with the brief behavioral activation treatment for depression (Lejuez et al., 2011). In RTW-I, patients received brief psychoeducation regarding behavioral activation and were helped primarily in taking steps towards returning to work and attaining a sustainable work situation. Nevertheless, there was no difference in trajectories between the two treatments in valued activation, i.e., the a-path. The b-path was significant, with increased behavioral activation being associated with decreased burnout, but the final indirect effect was not significant. Thus, behavioral activation was not a significant mediator in this study analyzing the mediated effect between CBT and RTW-I.

There were no differences in improvements in therapeutic alliance over time between the two treatments. Similarly, there was no association between therapeutic alliance and subsequent changes in burnout. Thus, therapeutic alliance was not found to be a mediator of change in this study. It should be noted, however, that the analysis in the present study relies on the assumption that therapeutic alliance exerts its effect on the outcome as a mediator. It is possible, as showed by Hoffart, Borge, Sexton, Clark, and Wampold (2012), that therapeutic alliance should be viewed as a predictor, and that initial level of therapeutic alliance predicts outcome.

There are several important strengths of this study. The randomized design allows for tentative conclusions about causal effects of the treatments on the outcome and the mediators, without bias of confounding variables. Weekly measurements of putative mediators and outcome permitted the time-lagged analysis of the effect of the mediator on the outcome, i.e., if change in a mediator predicted subsequent change in the outcome (Kraemer et al., 2002). Moreover, using multiple waves of data, analyzed with random effects, allows for appropriate modeling of individual change over time and therefore generate accurate estimates in longitudinal mediation models (Maxwell & Cole, 2007). Finally, assessment and treatments were conducted by well-trained licensed psychologists, which contribute to the high quality of the study.

Some limitations should also be noted. First, due to the lack of earlier research in this area, the investigated mediators of change were derived theoretically by the authors through previously published theoretical models of stress and the experience of treating clinical burnout with CBT. Other important potential mediators could therefore have been missed. Second, even though BADS-A measured balance and structure in activities, it is not designed to explicitly assess recovery. Inclusion of a measure that more specifically assesses recuperating activities might be informative in future research. Third, although the MINI has been shown to be a valid and reliable diagnostic tool (Sheehan et al., 1998), it should be acknowledged that we did not assess interrater reliability in the present sample. This would have been desirable, especially because we included the Swedish ICD-10 criteria for exhaustion disorder (The Swedish National Board of Health and Welfare, 2003) to the interview. Fourth, while RTW-I holds the advantage of being an active and structured psychological comparison, it is also a complex comparator as it features CBT-based psychoeducation and has a different treatment goal (work resumption in RTW-I vs. symptom reduction in CBT). Fifth, a causal relation can, due to the randomized design, be inferred concerning the a-path (association between treatment and mediator) and c-path (association between treatment and outcome) in the present study. However, the b-path (association between mediator and outcome) is correlational by nature (MacKinnon et al., 2007). This study shows that a time-lagged correlation, rather than causal relation, was present in the hypothesized direction for two of four mediators. Sixth, although multiple assessment points increased power in general to be able to detect both time-invariant and time-varying effects, it cannot be precluded that sample size limited detection of potentially meaningful differences in behavioral activation and therapeutic alliance between treatment arms.

In sum, the study provides new knowledge about potential mediators of change in CBT for clinical burnout. This study showed that CBT can yield large effects in the treatment of clinical burnout and that sleep quality and perceived competence are potential mechanisms of these effects and thus hold promise for further studies. If replicated, implications of this

study are that clinicians should (a) focus on sleep disturbance as an important maintenance factor of burnout that should be targeted in treatment and (b) make efforts to help patients improve their beliefs in their ability to handle their burnout symptoms and stress-related difficulties. While we believe that the results of the present study are promising, a highly important venue for future research is to further establish CBT as an empirically supported treatment for the large group of patients suffering from clinical burnout. Of course, a central part of this work is to increase our understanding of the mechanisms of treatment effect.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.beth.2018.08.005.

### Conflict of Interest Statement

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