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Breaking through the loss cycle of burnout: The role of motivation

Lieke L. ten Brummelhuis[1]*, Claartje L. ter Hoeven[2], Arnold B. Bakker[1] and Bram Peper[3]

[1]Department of Work & Organizational Psychology, Erasmus University Rotterdam, The Netherlands

[2]The Amsterdam School of Communication Research *ASCoR*, University of Amsterdam, The Netherlands

[3]Department of Sociology, Erasmus University Rotterdam, The Netherlands

We aimed to study burnout as a process that develops over time. On the basis of the Conservation of Resources theory (Hobfoll, 2002), we tested whether burnout induces a loss cycle, depleting resources, and enhancing demands. In addition, we investigated whether intrinsic job motivation and externally regulated job motivation attenuated or aggravated this loss cycle. Using a sample of 352 employees who answered online questionnaires in 2005 and 2007, we found that baseline burnout predicted future burnout that results from an increase in job demands (e.g., work overload) and a decrease in job resources (e.g., social support, information). Furthermore, external regulation aggravated the positive relationship between baseline burnout and demand accumulation. Intrinsic motivation attenuated the positive relationship between baseline burnout and resource loss. We conclude that intrinsic motivation is an important factor enabling employees to break through the negative cycle of burnout.

One of the most studied problems in the field of organizational psychology is burnout (Hobfoll, 1989). Burnout is a stress syndrome characterized by emotional exhaustion and cynicism (Schaufeli & Taris, 2005), generally caused by high job demands and a shortage in job resources (Cordes & Dougherty, 1993). Burnout produces considerable negative consequences for both employees and employers. For example, employees may suffer reduced well-being and increased marital conflicts, while employers may need to contend with high sickness-related absenteeism and impaired job performance (Bakker, Demerouti, & Verbeke, 2004; Bakker, Van Emmerik, & Van Riet, 2008; Hobfoll & Shirom, 2000; Taris, 2006). The significance of this problem is also indicated by findings reported in practice. For example, 10% of the Dutch workforce has been indicated as being at high risk of burnout (Breedveld & Van den Broek, 2004).

*Correspondence should be addressed to Lieke L. ten Brummelhuis, Erasmus University Rotterdam, Department of Work and Organizational Psychology, PO Box 1738, 3000 DR Rotterdam, The Netherlands. (e-mail: tenbrummelhuis@fsw.eur.nl).

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Despite researchers' great efforts to unravel the predictors of burnout (see for overviews, Cordes & Dougherty, 1993; Halbesleben & Buckley, 2004), a full understanding of the process of burnout – why feelings of burnout often have a long-term or even chronic character – is still lacking. It is possible that burnout has not been explained adequately because most studies do not regard burnout as a process that unfolds over time (Hobfoll, 1989, 2002). However, a commonly used theory to explain burnout, the Conservation of Resources (COR) model, describes burnout as a longitudinal process of resource loss (Hobfoll, 2002; Hobfoll & Freedy, 1993). Burnout can be seen as a downward cycle in which resource loss induces future resource loss and an accumulation of demands, thus facilitating the continuation of burnout. Although the idea of a loss cycle of burnout is appealing, it has only scarcely been tested empirically (Schaufeli, Bakker, & Van Rhenen, 2009). Therefore, the first objective of this study is to examine burnout as a process developing over time, using a longitudinal study design. Adopting the COR model as a theoretical basis, we question whether burnout fosters future resource loss and demand accumulation, resulting in increased levels of future burnout.

In addition, few studies have addressed the question of why certain employees develop burnout and why those employees seem to get stuck in this situation. Several researchers have suggested that resource management and coping with demands may differ between persons, depending on several personal characteristics (Parkes, 1994; Salanova, Peiro, & Schaufeli, 2002; Schaubroeck, Jones, & Xie, 2001). One personal factor that is particularly likely to influence the loss cycle of burnout is *motivation* (Fernet, Guay, & Senécal, 2004). In other psychology research domains, such as sports and educational psychology, motivation is the key construct explaining well-being and performance (Ryan & Deci, 2000a; Vallerand, 1997). Ryan and Deci (2000b) described the role of motivation in their Self Determination (SD) theory assuming that persons who are intrinsically motivated have more persistence, concentration, and effort in performing a task than extrinsically motivated persons. Moreover, unlike extrinsic motivation, intrinsic motivation is related to greater self-esteem and positive affect (Vallerand, 1997). The factors accompanying extrinsic motivation, such as negative affect and low persistence, could explain why some people are more susceptible to ending up in a downward cycle of burnout. Possibly, even more interesting is the idea that intrinsically motivated persons can break through the loss cycle of burnout as they put in extra effort and have a positive attitude to get out of a miserable situation. As a second objective, therefore, we test whether employees' type of motivation (intrinsic *vs.* extrinsic) moderates the loss cycle of burnout. We suggest that insights from SD theory could provide a useful elaboration of the COR model, illuminating the conditions under which a loss cycle of burnout is most likely.

Theoretical framework

Conservation of resources

Hobfoll (1989, 2002) aimed to develop a stress model that distinguishes the objective stressful situation from the person's appraisal of that situation. The COR model accomplishes this by describing what people do when confronted with a stressful situation. The key assumption of the COR model is '*. . . that people strive to retain, protect and build resources and that what is threatening to them is the potential or actual loss of these valued resources*' (Hobfoll, 1989, p. 516). Resources are defined as those objects, personal characteristics, conditions, or energies that are valued by the

individual or that serve as a means for attaining those objects, personal characteristics, conditions, or energies. Examples of each of the four types of resources are a home (objects), marriage (conditions), skills (personal characteristics), and time (energies). Stress occurs when people engage in a situation in which they need to invest many such resources while the return in resources is less (net loss), or when many resources must be put into place to prevent resource loss. For example, stress occurs when an employee is told that (s)he might be fired (loss of the resource *tenure*). The employee will try his/her best to keep his/her job by putting in additional time and energy to perform well at work (energy resources). The use of time and energy can result in feelings of burnout when the employee's time and energy supply is depleted (Freedy & Hobfoll, 1994; Halbesleben & Buckley, 2004). Furthermore, when the employee loses the job after all, this net loss (energy investment, loss in conditions) is assumed to result in severe strain.

The reciprocal relationship between stress and resource loss has been clarified more elaborately as a loss cycle (Demerouti, Bakker, & Bulters, 2004; Schaufeli *et al.*, 2009). In short, the loss cycle means that people who lack access to large resource pools are more likely to experience further resource loss while demands accumulate (Hobfoll & Shirom, 2000; Schaufeli *et al.*, 2009). Hobfoll (2002) offers three reasons for this downward process of resource loss and demand accumulation. First, people with few resources are more likely to encounter stressful circumstances. For example, people who lack a solid social network have less access to useful information and advice and are therefore less likely to be protected from stressful encounters (Ensel & Lin, 1991). Instead of steering clear of stressful situations, those people often misjudge the situation, and so they encounter even more problems for which they need even more resources. Second, people possessing fewer resources are less likely to solve problems inherent in stressful circumstances. For example, people who have excellent time management skills can better cope with a heavy workload, thus preventing demand accumulation (Macan, 1994). Alternatively, people who lack such skills see their work tasks piling up when they are confronted with extra work tasks. A third reason that resource loss seems to accumulate is that those less endowed with resources are harmed more severely by resource loss because they lack the resources to overcome this loss. Illustrative of this is the example of the higher risk of work-related burnout among single employees (Lautenbach, 2006). When those employees have a tough day at work, they lack resources at home, such as social support from a spouse, to compensate for this energy loss. (Ten Brummelhuis & Van der Lippe, 2010).

Insights from the COR model, and specifically the loss cycle, help explain the process of work-related burnout. At work, employees have access to a certain level of job resources that help them deal with job demands. *Job demands* refer to those physical, social, or organizational aspects of the job that require sustained physical and/or mental effort. *Job resources* are defined as those physical, psychological, social, or organizational aspects of the job that: (1) help achieve work goals; or (2) reduce job demands and the associated physiological and psychological costs; or (3) stimulate personal growth and development (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001, p. 501). Burned-out employees feel exhausted and are disengaged. Thus, burnout itself reflects a situation in which people are low in resources (low energy, negative mood). Reflecting the COR model, burnout then induces a loss cycle characterized by a further loss of resources and an accumulation of demands, which consequently increases feelings of burnout. At work, burned-out employees will be less successful in maintaining or collecting job resources while they are simultaneously less able to cope effectively with job demands. We test this idea, as formulated in the first hypothesis.

Hypothesis 1: Baseline burnout predicts future burnout through (a) a decrease in job resources and, (b) an increase in job demands (loss cycle).

Intrinsic and extrinsic motivation

In their SD theory explaining motives of human behaviour, Ryan and Deci (2000a) differentiate between those behaviours that are volitional and accompanied by the experience of freedom and autonomy, and those behaviours that are accompanied by the experience of pressure and control. The first impetus for behaviour refers to intrinsic motivation, whereas the latter reflects extrinsic motivation (Ryan & Deci, 2000b). Whereas the behaviour of an intrinsically motivated person emanates from his or her own interest, extrinsically motivated persons behave in a certain way to obtain a reward related to the behaviour, such as respect or a sense of belonging (Ryan & Deci, 2000b). Several categories of extrinsic motivation can be distinguished, varying in the degree to which it is autonomous. In a continuum, the type of extrinsic motivation that is closest to intrinsic motivation is labelled as integration. In this case, the person has internalized the reasons for an action and has brought that in congruence with the person's values and needs. At the other end of this continuum is external regulation, which refers to behaviour that is performed to satisfy an external demand. This type of extrinsic motivation involves mere compliance with an external control and is most different from intrinsic motivation (Ryan & Deci, 2000b).

The distinction between intrinsic and extrinsic motivation is important as they each inspire different behavioural patterns. The behaviour of intrinsically motivated persons can be described as more active. People doing something because they derive pleasure and satisfaction from performing an activity itself are more likely to start this activity in the first place. Moreover, once engaged in the activity, they are more effective in their behaviour as intrinsically motivation persons are more optimistic, expend more effort, and have greater perseverance (Ryan & Deci, 2000b; Ryan, Kuhl, & Deci, 1997). In contrast, the behaviour of extrinsically motivated persons can be characterized as more passive. When people undertake an activity as a means to an end and not for its own sake, they more often experience conflict and anxiety. In addition, it takes more effort to actually start the activity as extrinsically motivated individuals have less interest in the task. Behaviour that is driven by external regulation is also less effective, as people put in less effort, while their coping with failures is poorer (Ryan & Connell, 1989; Sheldon & Kasser, 1995). Extensive research has been undertaken to depict the effects of motivation on performance (see for overviews, Hardré, 2003; Vallerand, 2007). In short, those studies indicate that intrinsic motivation is associated with increased vitality, positive affect, self-esteem, absorption, concentration, effort, and persistence (Vallerand, 2007). Instead, extrinsic motivation is related to reduced engagement, performance, focus, stability, and increased fatigue (Connell & Wellborn, 1990; Hardré, 2003; Parfitt & Gledhill, 2004; Vallerand, 2007).

These insights are helpful in explaining how employees react when they experience feelings of work-related burnout. Research on motivation shows that extrinsically and intrinsically motivated employees differ in: (1) the amount of personal resources they have; and (2) how they cope with demands. First, intrinsic motivation itself can function as a personal resource (e.g., positive affect, self-esteem, resilience). Employees who are intrinsically motivated in their work have more of such resources, as intrinsic motivation goes along with more self-esteem, efficacy, and well-being (Vallerand, 2007). Thus, when faced with feelings of burnout, intrinsically motivated employees have more personal

resources that they can use to overcome this disadvantageous situation. Extrinsically motivated employees are less engaged at work, experience more negative emotions, have reduced concentration, and have a more negative attitude concerning the task at hand (Ryan & Deci, 2000b). Compared with intrinsically motivated employees, extrinsically motivated employees fall behind in the personal resources they can use to recover from or cope with their burnout. Second, the type of motivation determines a person's coping style or attitude in employing resources (Ryan & Connell, 1989). Intrinsically motivated employees are more likely to put effort into their tasks, are positive about the outcome, and are more effective and persistent in performing their tasks (Ryan & Deci, 2000b). Therefore, those employees will be better in handling heavy work demands, thus preventing further demand accumulation. Also, those employees put more effort into seeking resources at work, such as support from peers. By contrast, employees with an extrinsic motivation have less interest and persistence in performing their task, are more pessimistic about the outcomes and feel less competent (Ryan & Deci, 2000b). Because extrinsically motivated employees are less positive and have a passive coping style, they are less capable of dealing effectively with their demands and are less likely to gain new resources. As a result, resource loss and demand accumulation will further increase. We use the insights of the SD theory to predict how motivation affects the loss cycle of burnout, as formulated in the following hypotheses.

Hypothesis 2: Intrinsic motivation attenuates the positive relationship between baseline burnout and resource loss and demand accumulation, in such a way that (a) the decrease in resources and (b) the increase in demands resulting from baseline burnout are less pronounced when intrinsic motivation is high compared with when intrinsic motivation is low.

Hypothesis 3: Extrinsic motivation aggravates the positive relationship between baseline burnout and resource loss and demand accumulation, in such a way that (a) the decrease in resources and (b) the increase in demands resulting from baseline burnout are more pronounced when extrinsic motivation is high compared with when extrinsic motivation is low.

Method

Sample and procedure

Data were collected at the Dutch subsidiary of an international financial consultancy firm, which had 4,220 employees in 2005 and 4,617 employees in 2007. The company is a consultancy firm in the financial sector, a typical post-industrial knowledge-intensive company. The survey data were collected in 2005 and 2007, using a Dutch web-based questionnaire. In both years, respondents were reminded through digital newsletters to complete the survey. In 2005, 948 employees completed the questionnaire – a 22% response rate. In 2007, 1,014 employees participated in the study – also a 22% response rate. Data from the 2 years were merged, using the employees' personnel ID number. A total of 352 employees participated in both years, representing a 63% attrition rate. The attrition rates were somewhat higher among employees experiencing high levels of burnout, high job demands, and low job resources. For example, the attrition rate of employees scoring above average on exhaustion in 2005 was 67%. Similar attrition rates were found for employees scoring above average on cynicism (65%), work overload (64%), actual work hours (65%), and among employees scoring below the 2005 means of

supervisor support (65%) and co-worker support (67%). *T*-tests for differences indicated that the attrition rates for employees scoring high versus low on exhaustion ($t = 2.35, p < .05$) and co-worker support ($t = -2.65, p < .01$) differed significantly. We note, however, that our sample represents a population varying in levels of burnout, job demands, and job resources. Among our sample, 40% scored above the mean on exhaustion measured for the total respondents in 2005. Similarly, our sample includes adequate percentages of employees experiencing high levels of cynicism (46%), work overload (45%), and low levels of supervisor support (38%) and co-worker support (40%).

Moreover, the employees who participated in both 2005 and 2007 were largely comparable on several background characteristics to the employees who participated only in 2005. Regarding gender, education, marital status, contract hours, and job level, the response group did not significantly differ from the attrition group. In our sample, 51% were male, 75% were married or cohabiting. Most employees had a university (40%) or a higher vocational education (29%), and respondents had, on average, a contract for 36.5 hr weekly. We found a difference only in age: the sample group appeared to be somewhat older than the employees that participated only in 2005 (sample: 2005 $M = 39.68$; drop-outs: 2005 $M = 35.55$; t-value $= 6.01, p < .001$).

Measures

Burnout

The dependent variable in this study, *burnout*, was measured using the Dutch version (Schaufeli & Van Dierendonck, 1994) of the Maslach Burnout Inventory – General Survey (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996). Burnout is represented by its two core dimensions: emotional exhaustion and cynicism, each assessed with five items (Schaufeli & Taris, 2005). Items were rated on a 5-point scale ranging from 1 (*never*) to 5 (*always*). A sample item for emotional exhaustion was, 'I feel "used up" by my work' (2005: $\alpha = .85$; 2007: $\alpha = .87$). A cynicism item was, 'I am more cynical about the contribution of my work' (2005: $\alpha = .81$; 2007: $\alpha = .82$).

Job demands

We followed a common approach in organizational research to measure job demands and job resources with validated self-reporting scales (Bakker & Demerouti, 2007; Karasek *et al.*, 1998; Van Veldhoven & Meijman, 1994). Although self-reporting measures may be somewhat biased as they reflect the employee's perception of job characteristics, research has shown that the self-rating of job demands and job resources substantially correlates with ratings of independent observers (Demerouti *et al.*, 2001). We used three indicators of *job demands*: work overload, work hours, and work-family barriers. Work overload was measured with six items from the Job Content Questionnaire (JCQ; Karasek *et al.*, 1998) – for example, 'Do you have to work very hard?' (2005: $\alpha = .80$; 2007: $\alpha = .84$) – using 4-point scales ranging from 1 (*almost never*) to 4 (*always*). We asked employees to estimate their weekly work hours, using the following question: 'On average, how many hours do you actually work in your job at [company name]? (Count overtime, but not your travel time. Take an average week, without holidays)'. Work-home barriers were measured with the question: 'Which of the following items pose problems for your balance of work and private life?' Six fixed-answer alternatives were stated along with an option for an open-ended response. The fixed-answer alternatives included, for example, 'the lack of possibility to work part-time' and 'corporate culture

does not accept flexible working hours'. The number of barriers people experienced for their work-life balance was counted.

Job resources

Five *job resources* were included in this study: co-worker support, supervisor support, participation in decision-making, information, and autonomy. Co-worker social support was measured with four items from the JCQ (Karasek *et al.*, 1998) – for example, 'My colleagues help me get my work done' (2005: $\alpha = .79$; 2007: $\alpha = .78$). Supervisor social support was measured with five other JCQ items – for example, 'My direct supervisor is a good coach' (2005: $\alpha = .88$; 2007: $\alpha = .92$). Participation in decision-making was measured on a scale developed by Smidts, Pruyn, and Van Riel (2001). The scale consisted of eight items, such as 'Employees at [Company name] have sufficient input into decisions' (2005: $\alpha = .83$; 2007: $\alpha = .84$). Information was measured on a five-item sub-dimension of the communication climate scale devised by Smidts *et al.* (2001). A sample item of information was 'One often learns more about the organization talking to colleagues than from direct supervisors' (reverse-coded; 2005: $\alpha = .75$; 2007: $\alpha = .79$). All of the above four variables were rated on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). *Job autonomy* was measured on the Decision Authority Scale (JCQ; Karasek *et al.*, 1998). The scale consisted of four items – for example, 'Can you determine the content of your work yourself?' (2005: $\alpha = .81$; 2007: $\alpha = .80$) – using a 4-point scale ranging from 1 *(almost never*) to 4 (*always*).

Intrinsic motivation

Intrinsic motivation refers to the urge to perform a certain activity with the aim of experiencing the pleasure and satisfaction inherent in the activity (Ryan & Deci, 2000a). We used Bakker's (2008) intrinsic motivation subscale of the work-related flow inventory (WOLF) including these items: (1) 'I would still do this work, even if I received less pay'; (2) 'I find that I also want to work in my free time'; (3) 'When I am working on something, I am doing it for myself'; and (4) 'I get my motivation from the work itself, and not from the reward for it'. The 2005 (T1) variable was used in the model (2005: $\alpha = .87$). The items were rated on 5-point scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We checked whether the related, though reversed, constructs *intrinsic motivation* and *cynicism* covered two distinct measures. Confirmatory Factor Analysis (CFAs) confirmed that unlike the single-factor model ($\chi^2(35) = 338.79$, GFI = .80, RMSEA = .157, CFI = .73, TLI = .65), the two-factor model fit the data ($\chi^2(34) = 89.95$, GFI = .95, RMSEA = .068, CFI = .95, TLI = .93) and significantly improved the model fit $\Delta\chi^2(1) = 248.8$, $p < .001$).

Extrinsic motivation

Extrinsic motivation refers to the drive of doing something because it leads to a separable outcome such as profit or respect (Ryan & Deci, 2000a). We used a measure of external regulation, the subtype of extrinsic motivation that differs most from intrinsic motivation (Ryan & Deci, 2000b). External regulation was operationalized as the company's pressure on the employee to perform more work. It thus reflects the employee's perception of the company's external regulation of his or her work behaviour. In such demanding

Table 1. Means, standard deviations, and correlations of the model variables at T1 and T2

	T1		T2		T1-T2
	M	*SD*	*M*	*SD*	*R*
Exhaustion	2.33	0.68	2.36	0.71	.60**
Cynicism	2.11	0.71	2.21	0.73	.56**
Work overload	2.40	0.49	2.44	0.50	.63**
Work hours	40.41	8.72	39.66	10.28	.57**
Work home barriers	1.24	1.11	1.10	1.07	.59**
Co-worker support	3.87	0.51	3.89	0.50	.45**
Supervisor support	3.63	0.61	3.60	0.69	.36**
Job autonomy	2.80	0.56	2.78	0.55	.57**
Participation decision-making	3.75	0.45	3.73	0.46	.51**
Information	2.84	0.63	2.81	0.62	.50**
Intrinsic motivation	3.21	0.53	3.00	0.57	.47**
External regulation	3.40	0.81	3.45	0.62	.43**

Note. $N = 352$.

work settings, it is more likely that employees will have an externally regulated work motivation. We used the three-item subscale organizational time demands of the Work-Family culture scale developed by Thompson, Beauvais, and Lyness (1999), measured at T1 (2005: $\alpha = .68$). Sample items were 'To get ahead at [Company name], employees are expected to work overtime on a regular basis' and 'Employees are regularly expected to put their jobs before their personal lives.' Answer categories ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Table 1 provides an overview of the means and standard deviations of all model variables measured in 2005 and 2007.

Analysis

The hypotheses were tested by conducting structural equation modelling (SEM) using AMOS (Arbuckle, 2006). SEM is a preferable data analysis strategy for mediational models involving latent constructs (Baron & Kenny, 1986). We used the goodness-of-fit index (GFI) and the root mean square error of approximation (RMSEA) to examine the fit of the model to the data. We also used the comparative-fit-index (CFI) and the Tucker-Lewis Index (TLI). In general, models with fit indices of $>.95$ and an RMSEA of $<.06$ indicate a close fit between the model and the data, whereas fit indices between .90 and .95 represent a reasonable fit (Hu & Bentler, 1999).

For the analysis of the longitudinal data, we followed the procedure proposed by Smith and Beaton (2008) using residual scores. In this procedure, T1-T2 changes in demands and resources are measured as the residual scores obtained by regressing T2 scores of the demands and resources on the corresponding T1 scores. The differences between the predicted and the observed scores of T2 demands and resources are the standardized residual scores that we consequently included in the structural equation model (cf. Hobfoll, Johson, Ennis, & Jackson, 2003; Schaufeli *et al.*, 2009). Positive residual scores reflect an increase in demands or resources, whereas negative scores indicate a decrease. Note that the means of those change scores are zero, as they reflect standardized scores.

We used bootstrapping to test whether the significant pathways running between burnout at T1 and burnout at T2 through the difference in demands and resources do, in fact, represent mediated relationships. Bootstrapping is a statistical re-sampling method that estimates the parameters of a model and their standard errors strictly from the sample (Preacher & Hayes, 2008). We extracted new samples (with replacement) from our sample 2,000 times and calculated all direct and indirect estimates of the hypothesized model. Bootstrapping computes more accurate confidence intervals (CI) of indirect effects ($x \rightarrow m \rightarrow y$) than the more commonly used methods, such as the causal steps strategy (Baron & Kenny, 1986), as it does not impose the assumption that the sampling distribution is normal (Preacher & Hayes, 2008). This is especially relevant for indirect effects, as these have distributions that are skewed away from zero (Shrout & Bolger, 2002). The null hypothesis, which states that x does not have an indirect effect on y via m, is rejected when the entire CI lies above or below zero. We examined the specific indirect effects of x (burnout T1) on y (burnout T2) through for example $m1$ (Δ demands) by setting the path coefficients of the direct effect of x on y to zero, as well as the pathways of x to the other mediator (Δ resources) (MacKinnon, 2008: p. 145). For more information on bootstrap analyses, we refer to MacKinnon (2008).

To test the interaction effects of motivation, we conducted moderated structural equation modeling (MSEM) analyses, using AMOS (Arbuckle, 2006), as MSEM allows for assessing and correcting for measurement error, whereas it provides measures of the fit of the model under study simultaneously. We followed the procedure described by Cortina, Chen, and Dunlap (2001). For each hypothesized interaction effect, we tested a model that included three exogenous factors (burnout T1, motivation and their interaction term) and one endogenous factor (Δ resources or Δ demands). In total, we tested four models, one for each possible interaction between the two types of motivation (extrinsic or intrinsic) on the one hand and the difference in resources and the difference in demands on the other. Each exogenous variable had only one indicator that was the standardized scale score of the respective factor (Mathieu, Tannenbaum, & Salas, 1992). The indicator of the latent interaction factor was the multiplication of the standardized scale scores of the variables burnout T1 and the respective motivation type tested. The model included direct paths from the three exogenous to the endogenous factor. The factors burnout T1 and motivation were allowed to correlate, while correlations between burnout T1 and motivation, on the one hand, and the interaction term, on the other hand, were expected to be zero. Finally, the paths from the latent exogenous variables to their indicators were fixed using the square roots of the scale reliabilities, while the error variances of each indicator were set equal to the product of their variances and one minus their reliabilities. In Appendix A, we provided a graphical display of the MSEM analysis. We refer to Cortina *et al.* (2001) for further details on the calculation of the reliability score of the interaction term.

Results

Descriptive statistics

Table 2 shows the means, standard deviations, and correlations between the model variables. The correlations do not indicate problems of multicollinearity. We estimated two measurement models (T1 and T2) with scale items tapping the latent variables of all scale variables. Excluding the single item variables work hours and work-home barriers, the T1 measurement model included the scale variables exhaustion, cynicism,

Table 2. Means, standard deviations, and correlations of model variables

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Exhaustion T1	2.33	0.68													
2. Cynicism T1	2.11	0.71	0.50**												
3. Exhaustion T2	2.36	0.71	0.60**	0.38**											
4. Cynicism T2	2.21	0.73	0.34**	0.56**	0.55**										
5. Δ work overload	0.00	0.39	0.12*	0.14**	0.33**	0.16**									
6. Δ work hours	0.00	8.48	0.09	0.06	0.17**	0.06	0.10								
7. Δ work home barriers	0.00	0.87	0.13*	0.01	0.30**	0.17**	0.27**	0.19**							
8. Δ co-worker support	0.00	0.45	−0.16**	−0.16**	−0.20**	−0.37**	−0.07	0.07	−0.05						
9. Δ supervisor support	0.00	0.64	−0.21**	−0.15**	−0.24**	−0.40**	−0.13*	−0.01	−0.09	0.48**					
10. Δ job autonomy	0.00	0.45	−0.09	−0.11*	−0.20**	−0.25**	−0.11*	0.03	−0.03	0.25**	0.24**				
11. Δ participation decision-making	0.00	0.40	−0.08	−0.12*	−0.21**	−0.37**	−0.10	−0.02	−0.10	0.40**	0.44**	0.26**			
12. Δ information	0.00	0.53	0.01	−0.01	0.05	0.19**	0.07	0.01	0.03	−0.18**	−0.16**	−0.22**	−0.32**		
13. Intrinsic work motivation	3.22	0.53	−0.23**	−0.33**	−0.16**	−0.21**	−0.02	0.00	−0.01	0.10	0.11*	0.11*	0.14**	−0.03	
14. External regulation	3.40	0.81	0.19**	0.27**	0.16**	0.19**	0.07	0.12*	0.11*	−0.06	−0.05	−0.05	−0.03	−0.04	−0.03

Note. The difference (Δ) measures represent the standardized residuals, regressing T2 scores of the demands, and resources on the corresponding T1 scores. Significance levels: *$p < .05$; **$p < .01$; $N = 352$.

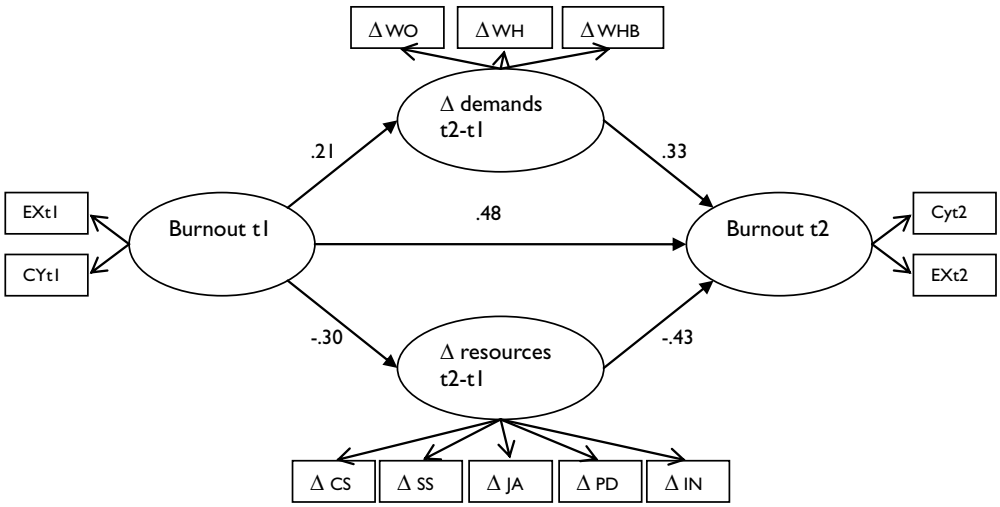

Figure 1. Loss cycle of burnout through decrease in resources and increase in demands.
Note. Entries represent standardized regression weights. WO = work overload; WH = work hours; WHB = work-home barriers; CS = co-worker support; SS = supervisor support; JA = job autonomy; PD = participation in decision-making; IN = information. All pathways are significant at the $p < .05$ level. $N = 352$.

work overload, co-worker support, supervisor support, participation in decision-making, information, autonomy, intrinsic motivation, and external regulation ($\chi^2(1018) = 2287.92$, RMSEA = .036, GFI = .91, CFI = .93, TLI = .92). All items had significant loadings, all above .41, on the intended factors ($p < .001$). Similarly, the T2 measurement model, including the same variables except the two motivation variables, showed an acceptable fit to the data, $\chi^2(736) = 1713.79$, RMSEA = .036, GFI = .92, CFI = .95, TLI = .94.

Loss cycle

Figure 1 depicts the structural model linking burnout T1 to burnout T2 through the difference in job demands and job resources. The structural model includes four latent constructs: burnout at T1 and burnout at T2, with the indicators cynicism and exhaustion at T1 and T2, respectively; difference in job demands, with the indicators work overload, work hours and work-home barriers; and difference in job resources (indicators co-worker support, supervisor support, participation in decision-making, information, and autonomy). All hypothesized pathways were significant and the model showed a good fit to the data ($\chi^2(46) = 106.68$, GFI = .95, RMSEA = .061, CFI = .94, TLI = .91). In line with our expectations, burnout at T1 was positively related to a difference in demands between T2 and T1, whereas a negative relationship with the difference in resources was found. In other words, baseline burnout was related to an increase in job demands and a decrease in job resources. Further, while controlling for burnout at T1 ($\beta = .48$, $p < .001$), we found that the difference in demands was positively related to burnout at T2, whereas the difference in resources was negatively related to T2 burnout. Thus, demand accumulation and resource loss predicted burnout at T2. The bootstrap analyses confirmed that the pathways running from T1 burnout to T2 burnout through a

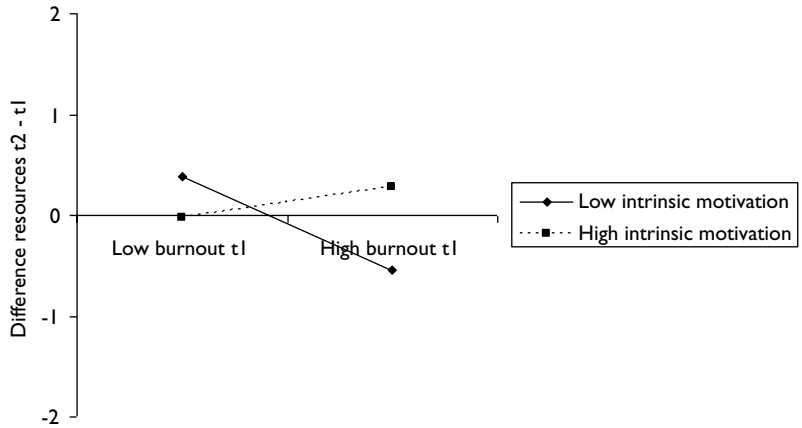

Figure 2. Interaction effect of burnout and intrinsic motivation on changes in job resources.

difference in demands (bootstrap estimate = .109, $SE = 0.056$, lower CI = 0.023, higher CI = 0.245, $p < .05$) and a difference in resources (bootstrap estimate = 0.119, $SE = 0.038$, lower CI = 0.056, higher CI = 0.208, $p < .01$) indeed represent mediation. Those results support Hypothesis 1 – that burnout at T1 predicts burnout at T2 through (a) a decrease in resources, and (b) an increase in job demands.

Motivation as a moderator

The interaction analyses showed that one of the two interaction terms for each type of motivation was significant. Intrinsic motivation significantly moderated ($\beta = .31$, $p < .001$) the relationship between burnout at T1 and the difference in *resources*. We depicted this interaction relationship in Figure 2. The graphical display clearly shows that burnout at T1 is associated with resource loss among employees with a low intrinsic motivation only (simple slope test, $\beta = -.40$, $p < .001$). For employees scoring at the maximum of the intrinsic motivation scale, the relationship between burnout at T1 and Δ resources was even positive (simple slope test, $\beta = .21$, $p < .01$), suggesting that those employees have more resources at T2 when they report high levels of burnout at T1. An examination of the moderation's region of significance revealed that the relationship between burnout at T1 and difference in resources is significant and negative among employees scoring below 3.06 on the intrinsic motivation scale (ranging from 1 to 5), whereas it is significant and positive among employees scoring above 4.60. The interaction model for intrinsic motivation fit the data well ($\chi^2(97) = 138.31$, GFI = .95, RMSEA = .035, CFI = .97, TLI = .96). Therefore, Hypothesis 2a was supported. More specifically, intrinsic motivation moderates the loss cycle of burnout in such a way that resource loss resulting from baseline burnout is present only among employees with low intrinsic motivation, and not among highly intrinsically motivated employees. As we did not find a significant interaction effect of intrinsic motivation and burnout T1 on the differences in *demands*, we could not support Hypothesis 2b.

The results did not support a significant interaction effect of external regulation and burnout T1 on the differences in *resources*. Thus, Hypothesis 3a was not supported. We did, however, find support for Hypothesis 3b. We found a significant interaction effect ($\beta = .16$, $p < .05$) of external regulation on the relationship between burnout

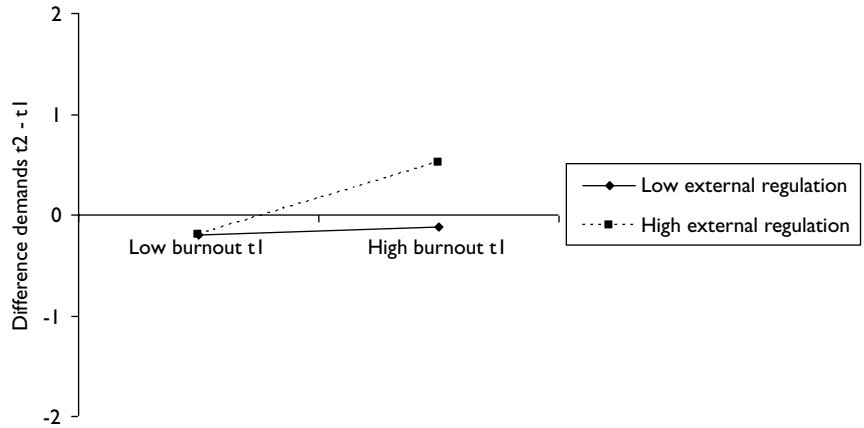

Figure 3. Interaction effect of burnout and external regulation on changes in job demands.

at T1 and the difference in *demands*. This interaction model had a good model fit ($\chi^2(97) = 116.68$, GFI = .96, RMSEA = .024, CFI = .99, TLI = .98). The positive relationship between burnout at T1 and the difference in demands was more pronounced when external regulation was high. Figure 3 depicts this interaction effect. Employees experiencing a high external regulation show an increase in demands in response to feelings of burnout at T1 (simple slope test, $\beta = .23$, $p < .01$), whereas this relationship is very weak among employees experiencing low external regulation (simple slope test, $\beta = .06$, *ns*). The CIs of the β values for low and high scores of external regulation indicated that the slopes for both groups did not significantly differ (CI for $M - 1\ SD = -0.01\ -1.25$; CI for $M + 1\ SD = 0.35\ -1.10$). The region of significance of the simple slope analyses specified that the relationship between burnout at T1 and difference in demands was only significant (positive) among employees scoring above 2.66 on the external regulation scale (ranging from 1 to 5). Thus, in line with Hypothesis 3b, external regulation moderates the loss cycle of burnout in such a way that demand accumulation resulting from baseline burnout is present only among employees with high external regulation, and not among employees with low external regulation.

Discussion

The first objective of this study was to examine burnout as a longitudinal process. We analysed whether employees' feelings of burnout accumulate over time because of an increase in job demands and a decrease in job resources. We indeed found support for the loss cycle of burnout. Employees experiencing higher levels at time 1 appeared to have gathered more job demands in the course of 2 years, indicated by increased working hours, work overload, and work-home barriers. Job resources, including social support at work, job autonomy, participation in decision-making, and information, were lower in 2007 in comparison with 2005 among employees with higher levels of burnout in 2005. As a result of demand accumulation and resource loss, employees with high levels of burnout in 2005 experienced even more feelings of burnout in 2007. Those findings support the COR theory (Hobfoll, 1989, 2002) that people with poor resources, specifically low levels of energy, are more susceptible to further resource

loss and demand accumulation. Those employees are presumably less likely to actively collect job resources, also known as job crafting – a process whereby employees adjust their job design to their own preferences, such as asking for supervisor feedback, or arranging more access to decision-making (Tims & Bakker, 2010; Wrzesniewski & Dutton, 2001). In addition, the work environment may also react differently towards burned-out employees. For example, exhausted and cynical employees invest less in collegial relationships (Ten Brummelhuis, Van der Lippe, & Kluwer, 2010), and they induce stress reactions in co-workers as well (Ten Brummelhuis, Bakker, & Euwema, 2010), whereby the social support they receive from colleagues is likely to diminish. Also, employees who lack energy and positive mood use less effective coping strategies (Leiter, 1991), resulting in the further accumulation of job demands. We suggest that those employees need more time for their work tasks, thereby making longer working hours. Also, as they cope less efficiently with work tasks, unfinished tasks pile up and work pressure further inclines. Our results indicate that feelings of burnout continue, with burned-out employees being more likely to lose resources at work while job demands further accumulate. Those results thus enhance our understanding of burnout.

Secondly, we aimed to examine whether motivation influences the extent to which feelings of burnout induce resource loss and demand accumulation. The two types of motivation – intrinsic motivation and external regulation – each moderated one of the processes of the loss cycle. Intrinsic motivation attenuated the process of resources loss, whereas external regulation strengthened the demand accumulation process. These findings are in line with previous research indicating that intrinsically motivated persons have a more active coping style (Ryan & Connell, 1989; Vallerand, 2007). Using an active coping style, those employees actively seek resources they can use to handle a stressful situation (Billings & Moos, 1981; De Rijk, Le Blanc, Schaufeli, & De Jonge, 1998). Accordingly, we found that employees with a high intrinsic motivation, as compared with low intrinsically motivated employees, did not lose resources over time as a result of feelings of burnout. Instead, high intrinsic motivation led employees to improve their resources at work, such as seeking support from co-workers and supervisors and participating in decision-making. The coping style of people feeling that their behaviour is externally regulated has been described by scholars as being more passive, with externally regulated people blaming others for problems and giving up on tasks sooner (Ryan & Connell, 1989; Vallerand, 2007). A passive coping style often results in inadequate handling of problems and even in the creation of other stressors (Jex, Bliese, Buzzell, & Primeau, 2001). Our findings support this view, as the increase in demands resulting from burnout was greater among employees scoring high (*vs.* low) on external regulation by the company. Externally regulated employees seemed to deal less efficiently with job demands resulting from feelings of burnout, leading to increased work hours, workload, and work-home barriers.

Remarkably, we found that intrinsic motivation did not attenuate demand accumulation and that external regulation did not facilitate further resource loss. We had expected that high intrinsic motivation would lead employees to tackle their work demands more actively. In the coping literature (e.g., Beehr, Johnson, & Nieva, 1995), active coping is also known as a problem-focused coping style whereby people attempt to 'remove or circumvent the stressor or to ameliorate its effects' (Carver, Scheier, & Weintraub, 1989). However, our results showed that intrinsically motivated employees were able to improve their job resources, but not to diminish their job demands. A possible explanation for this unexpected finding is that job demands are to a great extent prescribed by the company (Griffin, 1987). As most companies aim to maximize

their output, employees might be allowed to increase their workload, but it might be more difficult to reduce the amount of work one has to perform or to change the contractually arranged work hours (Campion, Mumford, Morgeson, & Nahrgang, 2005). Also, capabilities may limit the employee's work pace or quality, regardless of how motivated one is for the job. The finding that external regulation did not moderate the relationship between burnout and resource loss could result from our operationalization of external regulation. We measured this concept as the organization's pressure on employees to extend their workweek, to work overtime, and to prioritize work over other life domains. It is conceivable that this type of external regulation primarily elicits further investment in work, resulting in longer workweeks, and more work-family barriers, whereas it influences the collection of job resources to a lesser extent.

Limitations, future research, and practical implications

A major merit of our study was the use of a longitudinal design, which enabled us to detect differences in burnout, job demands, and job resources over time. Moreover, such a design diminishes causality issues that are common in cross-sectional studies. However, some limitations need to be mentioned as well. The use of self-reports may have led to bias because of common method variance. Momentary circumstances (e.g., mood) then affected both how respondents perceive their workload and how much of a feeling of burnout they have. We note, however, that this type of bias is less likely in our study design, as we were interested in the intra-person changes of job demands and job resources over time. Nevertheless, future studies could improve the measurement of burnout by including assessments by significant others (Bakker & Demerouti, 2007). Similarly, supervisor ratings of job demands and job resources could be used, enabling a comparison between those more reliable measures and the employee's perception. Simultaneously, measuring the value employees attach to several job resources might result in more insight in why certain resources help reducing burnout. In addition, our measurement of extrinsic motivation could be improved, distinguishing between the several subtypes of extrinsic motivation (identified regulation) and also including amotivation (Guay, Vallerand, & Blanchard, 2000). Moreover, the role of intrinsic and extrinsic job motivation in the continuation of burnout could be further investigated. Future studies could examine whether motivation changes over time and whether any changes result from the level of burnout experienced by the employee. Furthermore, new research could examine whether resource loss and demand accumulation also affect more objective work outcomes such as absenteeism and work performance.

The relatively low response rate was another limitation, as this could have led to a selective sample. However, comparisons between our sample and organization files showed that this was only a minor issue, as we found only marginal differences between our sample and the organization's population. We also note that our sample was somewhat selective as attrition was higher among employees scoring high, in comparison with those scoring low, on exhaustion at T1. It is thus possible that our results underestimate the relationships under study as our sample does not include employees experiencing the highest levels of exhaustion at T1 (Cook & Campbell, 1979). Presumably, those employees experienced even more feelings of exhaustion at T2, or even withdrew from work because of burnout. Also, the specific sample of employees from a single organization could be considered a weakness because its homogeneous nature limits the generalization of our findings to other occupational groups. Additional research should examine whether our findings can be generalized to employees in other

jobs, to employees from other backgrounds, and to employees in other cultures. Another suggestion for future studies is to extend the possible individual characteristics that affect the loss cycle of burnout. For example, self-esteem, optimism, and age could moderate the effects of burnout on resource loss and demand accumulation (Jex *et al.*, 2001). It also might be worthwhile to examine other factors that might stop the loss cycle from unfolding, such as the employee's job alternatives. Finally, we encourage researchers to use a three-wave longitudinal design, testing lagged mediation effects of burnout at T1, and to predict burnout at T3 through resource loss and demand accumulation (T2-T1). Such a design depicts the longitudinal process of burnout even more precisely.

Our study provides important implications for practice as our findings shed more light on the conditions that facilitate or prevent the continuation of burnout. Employees seem to be able to break through the loss cycle of burnout when they are highly intrinsically motivated in their jobs. By contrast, high external regulation placed on employees by the company is disadvantageous for employees who experience feelings of burnout, enhancing demands even further. It is thus important to design jobs that facilitate intrinsic motivation and to shape work environments with low or moderate external regulation. Such job designs can be created by providing employees with autonomy in designing and planning their tasks, by offering challenging work tasks, and by providing a work climate in which the employee feels related to others in the organization (Ryan & Deci, 2000a, 2000b).

Conclusion

Our study convincingly shows that burnout is a process that develops over time, and our study reveals the processes that keep the cycle going. Feelings of burnout induce a loss of job resources while job demands accumulate. Consequently, burnout further increases. We have shown that this process is even more pronounced when the employee feels high external regulation from the organization. The good news is that some employees seem to be able to break through the loss cycle of burnout. Intrinsically motivated employees collected more resources at work, which prevented feelings of burnout from intensifying. In summary, our findings emphasize the need to examine burnout as a process that develops over time and to include individual differences that affect the process of burnout (Boersma & Lindblom, 2009).

References

Arbuckle, J. L. (2006). *Amos 7.0 user's guide*. Springhouse, PA: Amos Development Corporation.

Bakker, A. B. (2008). The work-related flow inventory: Construction and initial validation of the WOLF. *Journal of Vocational Behavior*, *72*, 400–414.

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, *22*, 309–328.

Bakker, A. B., Demerouti, E., & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management*, *43*, 83–104.

Bakker, A. B., Van Emmerik, H., & Van Riet, P. (2008). How job demands, resources, and burnout predict objective performance: A constructive replication. *Anxiety, Stress, and Coping*, *21*, 309–324.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.

Beehr, T. A., Johnson, L. B., & Nieva, R. (1995). Occupational stress: Coping of police and their spouses. *Journal of Organizational Behavior*, *16*, 3–26.

Billings, A. G., & Moos, I. (1981). The role of coping responses and social resources in attenuating the stress of life events. *Journal of Behavioral Medicine*, *4*, 139–157.

Boersma, K., & Lindblom, K. (2009). Stability and change in burnout profiles over time: A prospective study in the working population. *Work & Stress*, *23*, 264–283.

Breedveld, K., & Van Den Broek, A. (2004). *The demanding society: The social-cultural context of emotional exhaustion*. The Hague: SCP.

Campion, M. A., Mumford, T. V., Morgeson, F. P., & Nahrgang, J. D. (2005). Work redesign: Eight obstacles and opportunities. *Human Resource Management*, *44*, 367–390.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*, 267–283.

Connell, J. P., & Wellborn, J. G. (1990). Competence, autonomy and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *The Minnesota symposium on child psychology* (pp. 43–77). Hillsdale, NJ: Erlbaum.

Cook, T., & Campbell, D. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Boston: Houghton Mifflin.

Cordes, C., & Dougherty, T. (1993). A review and an integration of research on burnout. *Academy of Management Journal*, *18*, 621–656.

Cortina, J. M., Chen, G., & Dunlap, W. P. (2001). Testing interaction effects in LISREL: Examination and illustration of available procedures. *Organizational Research Methods*, *4*, 324–360.

Demerouti, E., Bakker, A. B., & Bulters, A. J. (2004). The loss spiral of work pressure, work-home interference and exhaustion: Reciprocal relations in a three-wave study. *Journal of Vocational Behavior*, *64*, 131–149.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands resources model of burnout. *Journal of Applied Psychology*, *86*, 499–512.

De Rijk, A. E., Le Blanc, P. M., Schaufeli, W. B., & De Jonge, J. (1998). Active coping and need for control as moderators of the job demand-control model: Effects on burnout. *Journal of Occupational and Organizational Psychology*, *71*, 1–18.

Ensel, W. M., & Lin, N. (1991). The life stress paradigm and psychological distress. *Journal of Health and Social Behavior*, *32*, 321–341.

Fernet, C., Guay, F., & Senecal, C. (2004). Adjusting to job demands: The role of work self-determination and job control in predicting burnout. *Journal of Vocational Behavior*, *65*, 39–56.

Freedy, J. R., & Hobfoll, S. E. (1994). Stress inoculation for reduction of burnout: A conservation of resources approach. *Anxiety, Stress, & Coping*, *6*, 311–325.

Griffin, R. W. (1987). Toward an integrated theory of task design. *Research in Organizational Behavior*, *9*, 79–120.

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: The Situational Motivation Scale (SIMS). *Motivation and Emotion*, *24*, 175–213.

Halbesleben, J. R. B., & Buckley, M. R. (2004). Burnout in organizational life. *Journal of Management*, *30*, 859–879.

Hardré, P. L. (2003). Beyond two decades of motivation: A review of the research and practice in instructional design and human performance technology. *Human Resource Development Review*, *2*, 54–81.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*, 513–524.

Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, *6*, 307–324.

Hobfoll, S. E., & Freedy, J. (1993). Conservation of resources: A general stress theory applied to burnout. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional burnout: Recent developments in theory and research* (pp. 115–129). Washington, DC: Taylor & Francis.

Hobfoll, S. E., Johnson, R. J., Ennis, J. E., & Jackson, A. P. (2003). Resource loss, resources gain and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, *84*, 632–643.

Hobfoll, S. E., & Shirom, A. (2000). Conservation of resources theory: Applications to stress and management in the workplace. In R. T. Golembiewski (Ed.), *Handbook of organization behavior* (2nd ed., pp. 57–81). New York: Dekker.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *1*, 1–55.

Jex, S. M., Bliese, P. D., Buzzell, S., & Primeau, J. (2001). The impact of self-efficacy on stressor-strain relations: Coping style as an explanatory mechanism. *Journal of Applied Psychology*, *86*, 401–409.

Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology*, *3*, 322–355.

Lautenbach, H. (2006). Multiple work burden and burnout among women. *Social Economische Trends*, *2*, 11–14.

Leiter, M. (1991). Coping patterns as predictors of burnout: The function of control and escapist coping patterns. *Journal of Organizational Behavior*, *12*, 123–144.

Macan, T. H. (1994). Time management: Test of a process model. *Journal of Applied Psychology*, *79*, 381–391.

MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. New York: Erlbaum Psych Press.

Mathieu, J. E., Tannenbaum, S. I., & Salas, E. (1992). Influences of individual and situational characteristics on measures of training effectiveness. *Academy of Management Journal*, *35*, 828–847.

Parfitt, G., & Gledhill, C. (2004). The effect of choice of exercise mode on psychological responses. *Psychology of Sport and Exercise*, *5*, 111–117.

Parkes, K. R. (1994). Personality and coping as moderators of work stress processes: Models, methods and measures. *Work and Stress*, *8*, 110–129.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879–891.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, *57*, 749–761.

Ryan, R. M., & Deci, E. L. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist*, *55*, 68–78.

Ryan, R. M., & Deci, E. L. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*, 54–67.

Ryan, R. M., Kuhl, J., & Deci, E. L. (1997). Nature and autonomy: Organizational view of social and neurobiological aspects of self-regulation in behavior and development. *Development and Psychopathology*, *9*, 701–728.

Salanova, M., Peiro, J., & Schaufeli, W. B. (2002). Self-efficacy specificity and burnout among information technology workers: An extension of the demand–control model. *European Journal of Work and Organizational Psychology*, *11*, 1–25.

Schaubroeck, J., Jones, J. R., & Xie, J. L. (2001). Individual differences in utilizing control to cope with job demands: Effects on susceptibility to infectious disease. *Journal of Applied Psychology*, *86*, 265–278.

Schaufeli, W. B., Bakker, A. B., & Van Rhenen, W. (2009). How changes in job demands and resources predict burnout, work engagement and sickness absenteeism. *Journal of Organizational Behavior*, *30*, 893–917.

Schaufeli, W. B., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). The Maslach Burnout Inventory – GS. In C. Maslach, S. E. Jackson, & M. P. Leiter (Eds.), *Maslach Burnout Inventory manual* (pp. 22–26). Palo Alto, CA: Consulting Psychologists Press.

Schaufeli, W. B., & Taris, T. W. (2005). The conceptualization and measurement of burnout: Common ground and worlds apart. *Work & Stress*, *19*, 356–262.

Schaufeli, W. B., & Van Dierendonck, D. (1994). Burnout, the measurement of a concept: The Dutch version of the Maslach Burnout Inventory (MBI—NL). *Gedrag & Gezondheid*, *22*, 153–172.

Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. *Journal of Personality and Social Psychology*, *68*, 531–543.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, *7*, 422–445.

Smidts, A., Pruyn, A. T. H., & Van Riel, C. B. M. (2001). The impact of employee communication and perceived external prestige on organizational identification. *Academy of Management Journal*, *49*, 1051–1062.

Smith, P., & Beaton, D. (2008). Measuring change in psychological working conditions: Methodological issues to consider when data are collected at baseline and one follow-up time point. *Occupational and Environmental Medicine*, *65*, 288–296.

Taris, T. W. (2006). Is there a relationship between burnout and objective performance? A critical review of 16 studies. *Work & Stress*, *20*, 316–334.

Ten Brummelhuis, L. L., Bakker, A. B., & Euwema, M. C. (2010). Is family-to-work interference related to co-workers' work outcomes? *Journal of Vocational Behavior*, *77*, 461–469. doi:10.1016/j.jvb.2010.06.001

Ten Brummelhuis, L. L., & Van der Lippe, T. (2010). Effective work-life balance support for various household structures. *Human Resource Management*, *49*, 173–193. doi:10.1002/hrm.20340

Ten Brummelhuis, L. L., Van der Lippe, T., & Kluwer, E. S. (2010). Family involvement and helping behavior in teams. *Journal of Management*, *36*, 1406–1431. doi:10.1177/0149206309350778.

Thompson, C. A., Beauvais, L. L., & Lyness, K. S. (1999). When work–family benefits are not enough: The influence of work-family culture on benefit utilization, organizational attachment, and work-family conflict. *Journal of Vocational Behavior*, *54*, 329–415.

Tims, M., & Bakker, A. B. (2010). Job crafting: Towards a new model of individual job redesign. *South African Journal of Industrial Psychology*, *36*, 1–9. doi:10.4102/sajip.v36i2.841

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 271–360). San Diego, CA: Academic Press.

Vallerand, R. J. (2007). Intrinsic and extrinsic motivation in sport and physical activity. A review and a look at the future. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 59–83). New York: John Wiley & Sons.

Van Veldhoven, M., & Meijman, T. (1994). *Measurement of psychosocial labor burden*. Amsterdam: NIA.

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, *26*, 179–201.

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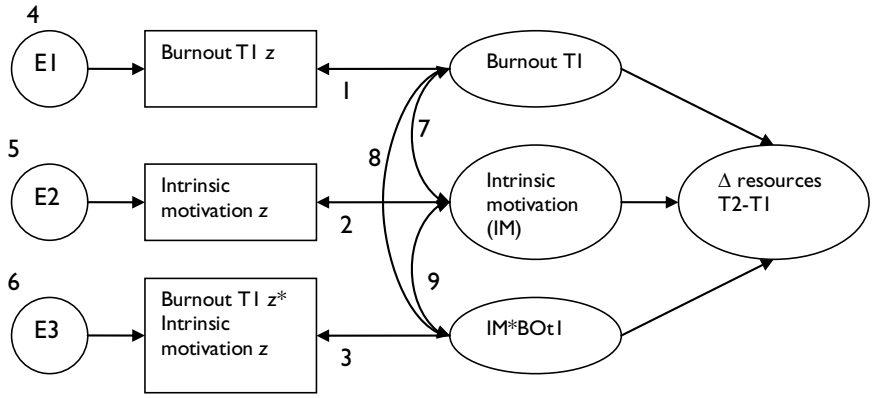
Appendix A



Example of MSEM analysis of the interaction effect of intrinsic motivation on the relationship between baseline burnout on the change in resources.

Legend
Path constraints

(1) $\sqrt{}\alpha$ burnout T1
(2) $\sqrt{}\alpha$ intrinsic motivation
(3) (α burnout T1 $*$ α intrinsic motivation) $+$ ($r^2/1 + r^2$)
(4) $1 - \alpha * s^2$ burnout T1
(5) $1 - \alpha * s^2$ intrinsic motivation
(6) $1 - \alpha * s^2$ burnout T1z $*$ Intrinsic motivation$z$
(7) allow to correlate
(8) fix correlation at 0
(9) fix correlation at 0

Symbols

E = measurement error
α = reliability of the scale variable
z = standardized score
r^2 = square of the correlation coefficient of burnout T1 and intrinsic motivation
s^2 = variance

Sources: Cortina *et al.* (2001) and Mathieu *et al.* (1992).