



## Lagged mediator effects of self-control demands on psychological strain and absenteeism

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In awareness of the increasing relevance of self-control for goal achievement and its adverse effects on psychological strain in different occupational contexts, we tested lagged mediational effects of self-control demands (SCDs) on emotional exhaustion, depersonalization, anxiety, and sum of days absent. The present analyses draw on two German longitudinal samples ( $N_{TOTAL} = 399$ ) and a measure of absenteeism. We used structural equation modelling and cross-lagged panel analyses to test our hypotheses. In line with theoretical arguments of action regulation theory, SCDs were found to mediate the longitudinal relationship between workload and exhaustion, anxiety, and sum of days absent at a later point in time, after controlling for other relevant job characteristics (workload, emotional dissonance, and job resources, such as job control and social support). Implications of the present results are discussed against the background of potential protective resources.

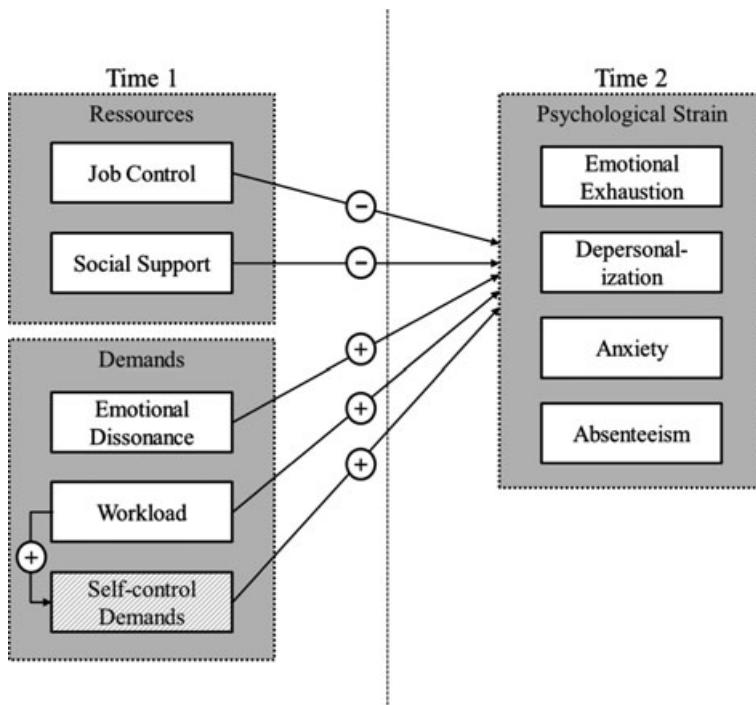
### Practitioner Points

- The present results indicate that job characteristics, which cause employees to engage in self-control, exert adverse effects on psychological well-being and absenteeism in the long run.
- HR managers as well as HR consultants should consider the double-sided nature of competency models and job specifications that include requirements on volitional self-regulation of thoughts, emotions, and behaviour (examples for commonly used behavioural anchors are given in the text).
- Our findings call for HR systems that provide assistance (such as self-management or self-control training programmes, emotional and social support) in facing self-control demands and exerting goal-directed regulation of behaviour.
- The effects on absenteeism shed light on long-term organizational costs that are associated with high demands on self-control and high workload.

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Recent findings of psychological research call attention to the role of self-control demands (SCDs) in many domains of life, such as athletics, health, personal relationship, academic performance, and, last but not least, the job domain (Muraven & Baumeister, 2000; Oaten & Cheng, 2005; Stumm, Thomas, & Dormann, 2010). As a volitional act, self-control involves inhibiting, modifying, or overriding spontaneous and automatic reactions, urges, emotions, and desires that would otherwise interfere with goal-directed behaviour (Baumeister, Heatherton, & Tice, 1994). In view of changing work environments in nearly all occupational and organizational settings (Cascio, 2003), employees are increasingly required to exert self-control to regulate their emotions, to adjust and monitor their goal-directed behaviour, and to encourage themselves to perform unattractive and highly demanding tasks (Pulakos, Arad, Donovan, & Plamondon, 2000; Vohs & Baumeister, 2010). However, as a growing body of evidence suggests, SCDs also produce psychological costs which become manifest in psychological strain (Hagger, Wood, Stiff, & Chatzisarantis, 2010; Oaten & Cheng, 2005). Moreover, recent studies revealed SCDs at work to relate to burnout symptoms, depressive symptoms, and absenteeism (Diestel & Schmidt, 2011a).

However, the role of SCDs in the interplay with other job characteristics remains largely unclear. Specifically, action regulation theory (ART; Hacker & Richter, 1990) and the model of self-control strength (Muraven & Baumeister, 2000; Robinson, Schmeichel, & Inzlicht, 2010) strongly suggest that SCDs explain why workload (work pressure and concentration requirements) results in strain and thus mediate the adverse effects of workload. To provide more insights into the role of SCDs in the development of psychological strain and absenteeism in the long run, this study tests whether and to what extent SCDs mediate longitudinal relations of workload to strain in terms of burnout



**Figure 1.** Theoretical model.

symptoms, anxiety, and absenteeism after partialling the lagged effects of other relevant job demands and resources.

Figure 1 depicts the theoretical model that forms the basis of our study. This model derives from the job demands–resources (JDR) framework (Bakker & Demerouti, 2007) that integrates relevant job characteristics influencing psychological well-being and absenteeism. Drawing on the idea that accomplishing workload involves regulation of goal-directed behaviour in terms of self-control, we hypothesized that SCDs mediate the path from workload to psychological strain and absenteeism and thus act as an explanatory process variable determining the adverse effects of workload. Consistent with the JDR framework, we controlled for other relevant job characteristics (social support, job control, and emotional dissonance).

In the following, we review recent findings from research on organizational stress and occupational health that suggest conceptualizing SCDs as relevant source of stress at work. Next, on the basis of ART and the model of self-control strength, we develop our hypotheses that predict mediator effects of SCDs in the relation of workload and psychological strain.

### ***Self-control demands: a source of stress at work***

Today's work is characterized by highly dynamic environments in which adaptability, flexibility, and self-regulation of employees and supervisors have become increasingly important (Cascio, 2003). Because of the shift from manufacturing-oriented businesses to service-oriented and technologically challenging businesses, employees are increasingly faced with demands for being flexible, responsive service providers who can effectively anticipate and fulfil changing customers' needs and being adaptive, creative, and innovative in applying new technologies (Giddens, 1991; Pongratz, 2004). This trend is illustrated by the following examples for commonly used behavioural anchors that are specified in competency models, which identify the core competencies of employees needed for goal achievement in a given organization or job role (Penning, 2008): 'controls and regulates his/her emotions in critical situations', 'acts purposefully and confidently, especially in ambiguous situations', 'demonstrates the ability to elaborate and evaluate complex information efficiently', or 'displays high willingness and commitment to outstanding performance'.

A large number of experimental studies indicate that achieving such emotional, behavioural, cognitive, and motivational requirements calls for volitional self-control and can impair behavioural performance and psychological well-being (for review, Hagger *et al.*, 2010; Muraven & Baumeister, 2000). In these experiments, acts of self-control involved, for example, regulating emotions and affective states, suppressing spontaneous and habitual impulses, overcoming inner motivational resistances, resisting interfering distractions, and updating working memory. Recently, on the basis of longitudinal studies, Oaten and Cheng (2005, 2006) reported that chronic exposure to such SCDs leads to elevated levels of strain, such as anxiety, depressive symptoms, emotional distress, and psychosomatic complaints.

In research on occupational health, scholars have primarily focused on the emotional component of such requirements and proposed that several processes of emotional labour constitute specific forms of volitional self-control (Diestel & Schmidt, 2011b; Schmeichel, 2007; Zapf & Holz, 2006). For example, Grandey (2000) distinguished between deep acting (trying to modify felt emotions in order to adapt internal experience to expected displays) and surface acting (engaging in a superficial display of the normative

emotion without making any effort to change one's true emotions). Consistent with models on emotion regulation (Gross, 1998), both strategies involve volitional self-control processes. However, while self-control is no longer exerted after deep acting engendered emotions required by the job role, performing surface acting requires sustained self-control and thus is more strongly associated with elevated levels of psychological strain (for review, Hülsheger & Schewe, 2011).

In awareness of the fact that SCDs do not only emerge from job-related requirements on emotion labour but also result from motivational, behavioural, and cognitive task or role requirements (Kehr, 2004; Muraven & Baumeister, 2000), Neubach and Schmidt (2007) developed and validated a measure that encompasses different, albeit strongly related forms of SCDs which have been proven to be relevant for goal achievement in different occupational settings (see also Schmidt & Neubach, 2010). According to their conceptualization that derives from the model of self-control strength (Muraven & Baumeister, 2000), different behavioural (impulse control: demand to inhibit spontaneous, impulsive response tendencies, and affective states), cognitive (resisting distractions: requirement to ignore or resist distractions evoked by task-irrelevant stimuli), and motivational (overcoming inner resistances: requirements to overcome motivational deficits to complete unattractive tasks) SCDs draw on and deplete a common cognitive resource that is limited and exhausted during the exertion of self-control. Among service employees, Schmidt and Neubach (2007, 2010) have found SCDs to predict various indicators of psychological strain, such as burnout and depressive symptoms, as well as psychosomatic complaints.

Consistent with Neubach and Schmidt's (2007) conceptualization, recent studies demonstrated that SCDs exert interactive effects on psychological strain (Diestel & Schmidt, 2009; Neubach & Schmidt, 2008) and that a composed measure of SCDs is most likely to reveal interactive effects with other job-related demands that are proposed to deplete the same resource (Diestel & Schmidt, 2011a). That is, given that achieving specific goals or accomplishing complex tasks often require several self-control processes simultaneously (Hagger *et al.*, 2010; Muraven & Baumeister, 2000; Robinson *et al.*, 2010), a composed measure of SCDs reflects the overall degree to which a given job role or function causes employees to engage in volitional self-control. Therefore, in this study, the different facets of SCDs are not further elaborated on and conceptualized as indicators of a cumulative job-related demand on volitional self-control.

### ***Mediating effects of SCDs in the relation of workload to strain and absenteeism***

According to Sonnentag and Frese's (2003) conceptualization of stress, workload is defined as a regulation problem that disturbs goal-directed behaviour. This definition draws on ART (Frese & Zapf, 1994; Hacker & Richter, 1990) which implies that – in case of high workload – demands on speed (time pressure or work volume) and intensity (concentration requirements due to complex tasks) can exceed and overtax employees' abilities to achieve their job goals. Thus, high workload exerts its effects on psychological strain through overtaxing regulation of goal-directed behaviour. In support of this argument, van der Linden, Frese, and Meijman (2003) reported that high task-related demands on speed and intensity of action regulation lead to elevated levels of strain.

In extending the theoretical view on goal-directed action regulation, research on volitional self-control provides insights into the processes involved in overtaxing regulation and may thus explain why high workload results in psychological strain (Robinson *et al.*, 2010; Schmeichel, Volokhov, & Demaree, 2008). Theoretically, ART

holds that regulation of goal-directed behaviour at work involves execution monitoring, aiming at, for example, controlling behavioural processes, regulating attentional focus, and persisting plan or intention realization (Frese & Zapf, 1994). Such processes are hypothesized to materialize at levels of conscious, intellectual regulation, or at least at levels of perceptual-conceptual regulation of behaviour and thus to involve working memory (see also Wieland-Eckelmann, 1992). Schmeichel (2007; see also Schmeichel *et al.*, 2008) has proposed and provided evidence that processes that are induced by task-related requirements and draw on working memory capacity require volitional self-control.

Consequently, we argue that exertion of self-control is one key mechanism that determines goal-directed action regulation when working memory is involved. In support of this argument, Robinson *et al.* (2010) put forward the notion that several self-control processes, such as task motivation (overcoming inner resistances), task monitoring (resisting distractions), and behavioural control (impulse control) simultaneously guide higher order goal-directed action regulation. Thus, if workload in terms of high demands on speed and intensity of action regulation requires cognitive or volitional effort to achieve task-related goals, workload will cause employees to engage in self-control. This argument implies that – in case of high workload – employees experience high SCDs, whose conceptualization is more closely related to the processes involved in regulation of goal-directed behaviour (Schmidt & Neubach, 2010). Consequently, SCDs should mediate the relation of workload to psychological strain and absenteeism.

### **Study design and hypotheses development**

To provide an empirically strong test of mediator effects of SCDs, two aspects have to be considered that are emphasized by recent findings and theoretical developments in research on well-being at work. First, integration of SCDs in a solid conceptual framework that specifies relevant job characteristics and accounts for well-being is imperative, when establishing SCDs as a process variable that explains relations of one specific characteristic (workload) to strain (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). The JDR model that has been repeatedly confirmed to apply to different occupational contexts, provides a well-founded framework for well-being at work (Bakker & Demerouti, 2007). According to this model, job demands (requiring sustained physical and/or psychological effort or skills and are therefore associated with strain) impair well-being at work while job resources (that are functional in achieving work goals, reduce job demands and strain, and stimulate personal learning) foster it. Past research has repeatedly revealed that job control and social support constitute relevant job aspects, which function as protective resources and thus reduce strain (Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010). On the demand side (besides workload), emotional labour can also impair well-being, especially when emotions have to be displayed that are not truly felt, and employees thus experience emotional dissonance (Abraham, 1998; Zapf & Holz, 2006). Thus, to allow for a valid prediction of strain (see Figure 1), the mediating function of SCDs should be grounded in the JDR model and analysed in the interplay with other relevant job characteristics in terms of job control and support as resources and emotional dissonance as another important job demand.

Second, in prior research, relations of SCDs to psychological strain have been mainly tested on the basis of cross-sectional designs (Diestel & Schmidt, 2009; Schmidt & Neubach, 2007). Only Diestel and Schmidt (2011a) provided some evidence on the time-lagged effects of SCDs. However, without cross-validating in different multi-wave

samples and controlling for other relevant job characteristics, more research on intra-individual changes as a function of SCDs is warranted because valid tests of complex effects and reducing common method biases are increasingly important for drawing solid conclusions in view of dynamic and changing work contexts (Dormann, Zapf, & Perels, 2010; Zapf, Dormann, & Frese, 1996).

Because emotional exhaustion and depersonalization have been repeatedly revealed to reflect impairments of volitional processes (van der Linden, Keijsers, Eling, & Schaijk, 2005), Schmidt, Neubach, and Heuer (2007) proposed that both burnout variables are very sensitive to increased efforts in self-control and resulting resource depletion. Studies on interactive effects of SCDs provide support for this proposition (Neubach & Schmidt, 2008). Moreover, relations of SCDs to anxiety that have been reported by Schmidt and Neubach (2007) suggest that under adverse influences of high stress, employees suffer from feelings of tension, uneasiness, and nervousness and hence from a lack of control due to resource depletion (Chorpita & Barlow, 1998). Specifically, a lack of control over relevant outcomes may be related to volitional self-control efforts and become manifest in anxiety as an indicator of impaired well-being. Finally, on the basis of the conservation of resources theory (Hobfoll, 1989; Hobfoll & Freedy, 1993), Darr and Johns (2008) have conceptualized absenteeism as a behavioural manifestation of withdrawal from work that aims at recharging depleted resources (Staw & Oldham, 1978). According to this 'restorative function', employees engage in withdrawal behaviour in the form of absenteeism when they feel less able to achieve job requirements and fail to use effective regulation strategies (see also Schaufeli, Bakker, & van Rhenen, 2009). This argument is consistent with our proposition that workload as demands on speed and intensity requires volitional self-control and thus depletes cognitive resources. That is, in case of high workload and high SCDs, overtaxing regulation results in control failures and need for recovery due to volitional resource depletion. As workload has been repeatedly found to relate to absenteeism (e.g., Hystad, Eid, & Brevik, 2011), SCDs may explain the link to absenteeism that is proposed to fulfil a 'restorative function'. Drawing on all these arguments, we derive the following hypotheses:

*Hypothesis 1:* SCDs mediate the longitudinal relations of workload to emotional exhaustion (Hypothesis 1a), depersonalization (Hypothesis 1b), anxiety (Hypothesis 1c), and absenteeism (Hypothesis 1d).

## Method

### **Participants and procedure**

Our hypotheses were tested in two German longitudinal samples. The first study was carried out in a large health insurance company and involved a cross-lagged panel design with two waves (12-month interval). In this study, we examined lagged mediator effects of SCDs on exhaustion and depersonalization. To cross-validate and extend the findings from the first study, we conducted a second study that also involved a cross-lagged panel design with two waves (24-month interval) and included anxiety and absenteeism as additional outcomes. Participants of the second study were recruited from a large financial service institution. Taris, LeBlanc, Schaufeli, and Schreurs (2005) argued that using 1- or 2-year intervals is adequate for controlling seasonal influences. In their panel analyses, Taris *et al.* (2005) used different time intervals to cross-validate hypothesized longitudinal relations across different time frames. We applied a similar procedure and, as a conservative test of our hypotheses, we also analysed reverse relations as well as different mediator models.

***Sample 1***

The first sample consisted of service employees of a health insurance agency in Germany. In their daily job, the surveyed employees were involved in developing health care concepts, providing insurance services and attending to clients. The company's management intended to identify potential causes of burnout among its employees and requested us to conduct a survey. Participants were assured that completing the questionnaire was voluntary and that their data would remain confidential. At Time 1, a total of 246 employees completed the questionnaire. This accounts for 60.89% of the total sample asked to participate in the study. After 12 months, 326 employees responded to the survey, yielding a response rate of 75.6%. A final sample of 174 employees completed the questionnaire on both survey times. The participants averaged 41.33 years of age ( $SD = 9.70$ ; range = 20–57). Seventy-nine per cent of participants were female and 95% were full-time employees.

***Sample 2***

Participants of the second sample were financial consultants and recruited from a large financial service institution. The core tasks of the surveyed employees included providing consulting services in face-to-face interactions, requesting and evaluating information about income, budget, and financial assets. The management of the institution provided approval for employees to participate in the study. Questionnaires were administered in small groups of about 15 people during normal working hours. Again, completing the questionnaire was voluntary, and all participants were assured that their data would remain confidential. At Time 1, a total of 341 employees were surveyed. This accounts for 61.88% of all employees asked to participate in the study. After 24 months, 252 employees completed the questionnaire, yielding a response rate of 57.53%. A final sample of 225 employees was found to provide data on both survey times. Absence data for the 12-month period before the first and after the second survey were available for all participating employees. Participants were between 19 and 59 years of age ( $M = 41.52$ ,  $SD = 9.12$ ). Fifty-four per cent of the samples were women and 89.3% were employed on a full-time basis.

***Attrition in both samples***

According to a one-way analysis of variance, the mean scores for the study variables (Time 1) of those who did not participate on second survey did not differ from those who remained in the study ( $p > .20$ ).

***Measures******Job control***

The assessment of job control is based on 10 items, which refer to the perceived extent to which an employee can influence the temporal sequence of task accomplishment (timing control; e.g., 'To what extent can you determine the order in which you do things?') and can choose different strategies and methods (method control; e.g., 'To what extent can you decide how to go about getting your job done?'; Jackson, Wall, Martin, & Davids, 1993; Schmidt, 2004). The responses are made on a 4-point scale running from 1 (not at all) to 4 (a great deal).

### *Social support*

We measured social support using Frese's (1989) scale that encompasses support from colleagues (five items; e.g., 'How do your colleagues provide support so that your work is getting easier?') and supervisors (five items; e.g., 'To what extent can you count on your supervisor when things are getting complicated at work?'). All items are scored on a 6-point rating scale (1 = *not at all*, 4 = *a great deal*).

### *Workload*

The measurement of workload was based on two subscales of an instrument developed by Prümper, Hartmannsgruber, and Frese (1995). Each original 2-item subscale was extended by constructing one additional item. Participants responded on a 5-point scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). Concentration requirements reflect an employee's experienced degree of task complexity and demands on concentration (e.g., 'My work makes high demands on my power of concentration'). Work pressure covers perceived time pressure and work volume (e.g., 'At my work, I often feel that I am under time pressure').

### *Emotional dissonance*

The measurement of emotional dissonance was based on five items that assessed the frequency of experienced discrepancies between genuinely felt emotions and those required by the job role (e.g., 'How often do you have to show feelings at work that you do not really feel?'). The items were adapted from the Frankfurt Emotion Work Scales (Zapf, Vogt, Seifert, Mertini, & Isic, 1999). The response format of this scale ranges from 1 (*never*) to 5 (*very often*).

### *Self-control demands*

We assessed SCDs using Neubach and Schmidt's (2007) 15-item scale that covers impulse control (six items; e.g., 'At work, I am not allowed to give way to any spontaneous reactions under any circumstances'), resisting distractions (four items; e.g., 'In order to achieve my performance goals, I must not let myself be distracted'), and overcoming inner resistances (five items; e.g., 'Starting off with certain tasks sometimes costs me a considerable amount of will power'). All items are scored on a 5-point intensity rating format (1 = *not at all*, 5 = *a great deal*). As the three SCDs are hypothesized to draw on a single resource, we used a composed measure of SCDs (Diestel & Schmidt, 2011a; Schmidt, Hupke, & Diestel, 2012).

### *Burnout*

The two burnout dimensions of *emotional exhaustion* and *depersonalization* were measured by Büsing and Perrar's (1992) German translation of the Maslach Burnout Inventory (Maslach & Jackson, 1986). Exhaustion (nine items) refers to feelings of being overextended and drained by job demands (e.g., 'I feel emotionally drained from my work'). Depersonalization (four items) is characterized by a detached, indifferent, and cynical attitude towards people with whom one has to interact at work (e.g., 'I have become more callous towards people since I took this job'). All items are scored on a 6-point rating scale (1 = *not at all*, 6 = *very strong*).

### Anxiety (only Sample 2)

For measuring anxiety, a German adaptation (Laux, Glanzmann, Schaffner, & Spielberger, 1981) of the State-Trait Anxiety Inventory developed by Spielberger, Gorsuch, and Lushene (1970) was applied. The state component of anxiety was chosen to focus on feelings of tension, uneasiness, and nervousness. The 20 items are scored on a 4-point rating scale ranging from 1 (*not at all*) to 4 (*very much*).

### Absenteeism (only Sample 2)

As an indicator for involuntary absence (Hammer & Landau, 1981; Johns, 2002), sum of days absent (the total sum of days absent from work) was used to assess absenteeism. Absence data were drawn from personnel records and related to a period of 12 months before the first wave and a period of 12 months after the second wave of data collection in Sample 2. These data mainly include absence due to sickness and did not count absences because of holidays, maternity leave, military service, and participation in training courses. Since the distribution of the absence measure deviated from normality, leading to biases in parameter estimations (Hammer & Landau, 1981), all raw scores were subjected to a square root transformation (see Clegg, 1983). After transformation, skewness and kurtosis were less than 1 and 2, respectively, and thus met the criteria for covariance-based analyses (see Geurts, Buunk, & Schaufeli, 1994).

### Statistical analysis procedure

Using cross-lagged panel design, our hypotheses were tested by means of structural equation modelling (SEM; Bollen, 1989). All items for assessing the study variables were aggregated into parcels. These parcels were specified as indicators for the latent constructs. The parcelling procedure was based on the item-to-construct balance method that places lower loaded items with higher loaded items and thus minimizes loading differences among indicators (Little, Cunningham, Shahar, & Widaman, 2002). Sum of days absent was introduced as a manifest variable. According to Dormann *et al.* (2010; Kline, 1998), temporal stabilities of the outcomes between both times and all correlations among the outcomes and predictors at Time 1 were estimated accordingly in both samples. This procedure allowed us to predict intra-individual changes in the outcomes at Time 2 as a function of changes in the predictors at Time 1 (job control, social support, emotional dissonance, workload, and SCDs) and thus to minimize confounding influences. In both samples, age, gender, and working time status (part vs. full time) were also specified to predict the outcomes to reduce the risk of spurious relationships due to biographical differences in the study variables.

For testing lagged mediator effects, SCDs at Time 1 were regressed on workload at Time 1 (correlations between both were not estimated). Direct paths from workload and SCDs at Time 1 to the strain and absenteeism at Time 2 were also specified. To test the indirect effect ( $\beta_{ind}$ ) of workload at Time 1 through SCDs at Time 1, we utilized bias-corrected and accelerated bootstrapping with 1,000 samples (Cheung & Lau, 2008; Shrout & Bolger, 2002). Based on this procedure, 95% confidence interval (95% CI) around the point estimations of the indirect effects was estimated. Accordingly, a 95% CI that excludes zero confirms a significant mediation effect. For evaluating global model fit, root mean square error of approximation (RMSEA  $<.05$ , with a lower  $CI_{90\%}$  bound of  $<.05$  and a higher  $CI_{90\%}$  bound of  $<.10$ , see Chen, Curran, Bollen, Kirby, & Paxton, 2008), gamma hat ( $>.95$ ; Fan & Sivo, 2007), comparative fit index (CFI  $> .97$ ), and standardized root mean

residual ( $\text{SRMR} < .05$ ) were employed (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

Prior to testing primary hypotheses, confirmatory factor analyses were conducted to validate distinctness of all study variables. All parameter specifications and estimations were conducted with Mplus 5.1 (Muthén & Muthén, 2007).

## Results

### **Descriptive statistics**

For both samples, descriptive statistics, coefficient alphas, and intercorrelations for all measures are presented in Tables 1 and 2.

### **Measurement models**

CFA facilitated the distinctness of job control, social support, workload, emotional dissonance, and SCDs (to save journal space, we provide only examples: for more information regarding measurement models, please contact the first author). In both samples and waves, the proposed five-factor model yielded a good fit (e.g., Sample 1/Time 1:  $\chi^2(34) = 47.21$ , n. s., RMSEA = .047, CI<sub>90%</sub> = .000–.055, SRMR = .025, gamma hat = .996, CFI = .996) and fitted the data significantly better than a model that combined all resources to one factor and all demands to another factor (e.g., Sample 1/Time 1:  $\Delta\chi^2(9) = 281.30$ ,  $p < .01$ ). On the outcome side, the proposed two-factor model that differentiated between emotional exhaustion and depersonalization also showed a good fit to the data of Sample 1 (e.g., Time 2:  $\chi^2(4) = 2.33$ , n. s., RMSEA = .000, CI<sub>90%</sub> = .000–.089, SRMR = .009, gamma hat = 1.00, CFI = 1.00) and performed significantly better than a model that integrated exhaustion and depersonalization to one factor (e.g., Time 2:  $\Delta\chi^2(1) = 30.45$ ,  $p < .01$ ). Similarly, in Sample 2, the proposed three-factor model that differentiated between exhaustion, depersonalization, and anxiety gained most support (e.g., Time 2:  $\chi^2(17) = 23.72$ , n. s., RMSEA = .042, CI<sub>90%</sub> = .000–.079, SRMR = .024, gamma hat = .993, CFI = .993) and was significantly better than a model that assumed a general strain factor (e.g., Time 2:  $\Delta\chi^2(3) = 239.30$ ,  $p < .01$ ).

### **Analysis of latent lagged and mediator effects of SCDs**

#### *Sample 1*

Table 3 represents the standardized parameter estimations of the outcome stabilities and of the lagged effects of the biographical variables and the job characteristics as well as the indirect effects of workload in the health insurance sample. The global fit of the cross-lagged panel SEM turned out to be adequate ( $\chi^2(186) = 247.15$ ,  $p < .01$ , RMSEA = .043, CI<sub>90%</sub> = .027–.057, SRMR = .047, gamma hat = .972, CFI = .971). After controlling for biographical data and outcome stability, SCDs at Time 1 predicted emotional exhaustion at a later point in time. However, depersonalization at Time 2 failed to reflect any effect of job characteristics at Time 1.

In support of Hypothesis 1a, the bootstrapping procedure revealed a significant lagged indirect effect of workload at Time 1 on exhaustion at Time 2 through SCDs at Time 1. However, the indirect effect of workload at Time 1 on depersonalization at Time 2 was not significant. In sum, only exhaustion at Time 2 was found to reflect lagged mediator effects of SCDs at Time 1 in the health insurance sample.

**Table I.** Means, standard deviations, intercorrelations, and internal consistencies estimates of variables in Sample I

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Time 1</i>																	
1. Age	—																
2. Gender <sup>a</sup>	-.07	—															
3. Working time status <sup>b</sup>	.01	.11	—														
4. Job control	.18	-.11	-.19	—													
5. Social support	-.05	.08	.01	.11	—												
6. Workload	.17	.03	-.05	-.10	-.17	—											
7. Emotional dissonance	.08	.19	.08	-.23	-.23	.43	—										
8. Self-control demands	.13	.01	.13	-.08	-.12	.29	.32	—									
9. Emotional exhaustion	.14	.02	.01	-.11	-.23	.62	.50	.38	—								
10. Depersonalization	-.06	.11	.02	-.14	-.15	.53	.46	.25	.58	—							
<i>Time 2</i>																	
11. Job control	.21	-.01	-.08	.56	-.17	-.18	-.31	-.09	-.17	-.26	—						
12. Social support	.09	.07	.05	.10	.54	-.28	-.21	-.13	-.24	-.19	.27	—					
13. Workload	.16	.06	-.10	-.03	-.23	.58	.45	.42	.56	.45	.21	.28	—				
14. Emotional dissonance	.00	.12	-.05	-.11	-.15	.37	.51	.39	.39	.48	-.24	.26	.52	—			
15. Self-control demands	.10	.08	-.01	-.03	-.22	.30	.28	.44	.37	.33	-.15	.22	.46	.44	—		
16. Emotional exhaustion	.16	.06	.05	-.13	-.23	.53	.50	.47	.74	.53	-.30	.31	.72	.53	.41	—	
17. Depersonalization	-.02	.09	-.01	-.13	-.11	.43	.47	.28	.44	.66	-.27	.17	.41	.59	.31	.63	—
M	41.33	1.21	1.95	3.05	3.14	3.05	2.78	4.00	2.80	2.10	3.00	3.12	3.00	2.81	3.91	2.73	2.22
SD	9.70	0.41	0.21	0.58	0.46	0.65	0.80	0.70	0.92	0.74	0.56	0.42	0.78	0.84	0.71	1.00	0.90
$\alpha$				.84	.85	.80	.88	.82	.87	.60	.82	.80	.85	.91	.81	.90	.72

Note. N = 174.

<sup>a</sup>Gender (1 = female, 2 = male).<sup>b</sup>Working time status (1 = part-time, 2 = full-time). Numbers in bold  $p < .05$  (two-tailed test)

**Table 2.** Means, standard deviations, intercorrelations, and internal consistencies estimates of variables in Sample 2

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<i>Time 1</i>																					
1. Age	—																				
2. Gender <sup>a</sup>	.20	—																			
3. Working time status <sup>b</sup>	.01	.29	—																		
4. Job control	.11	-.05	-.07	—																	
5. Social support	-.07	-.12	.02	.12	—																
6. Workload	-.01	.21	.05	-.31	-.18	—															
7. Emotional dissonance	.01	.20	.10	-.12	-.28	.25	—														
8. Self-control demands	.08	.28	.06	-.35	-.38	.52	.43	—													
9. Emotional exhaustion	-.07	.23	.04	-.35	-.33	.63	.38	.60	—												
10. Depersonalization	-.17	.11	.06	-.12	-.03	.31	.39	.31	.43	—											
11. Anxiety	-.09	.06	-.01	-.33	-.34	.45	.36	.50	.69	.26	—										
12. Sum of days absent	.07	.04	-.11	-.05	-.18	.04	.12	.24	.12	.13	.12	—									
<i>Time 2</i>																					
13. Job control	.10	-.09	-.08	.65	.14	-.27	-.20	-.36	-.32	-.14	-.30	-.14	—								
14. Social support	-.15	-.15	.05	.17	.61	-.06	-.23	-.31	-.20	-.09	-.19	-.22	.25	—							
15. Workload	.02	.24	.14	-.24	-.16	.51	.17	.44	.42	.18	.31	.07	-.44	-.21	—						
16. Emotional dissonance	.04	.22	.16	-.12	-.23	.23	.52	.33	.29	.30	.26	.13	-.26	-.27	.30	—					
17. Self-control demands	.13	.27	.07	-.24	-.21	.32	.33	.64	.38	.18	.34	.17	-.43	-.28	.62	.47	—				
18. Emotional exhaustion	.00	.20	.11	-.30	-.27	.51	.39	.58	.67	.35	.52	.14	-.45	-.32	.59	.47	.62	—			
19. Depersonalization	-.22	.14	.09	-.20	-.13	.35	.45	.37	.47	.65	.37	.14	-.33	-.22	.34	.52	.38	.61	—		

Continued

**Table 2.** (Continued)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
20. Anxiety	.02	<b>.16</b>	.08	<b>-.33</b>	<b>-.33</b>	<b>.43</b>	<b>.38</b>	<b>.55</b>	<b>.58</b>	<b>.27</b>	<b>.72</b>	<b>.17</b>	<b>-.40</b>	<b>-.36</b>	<b>.40</b>	<b>.39</b>	<b>.54</b>	<b>.71</b>	<b>.42</b>	—	
21. Sum of days absent	-.11	-.02	-.11	<b>-.18</b>	<b>-.19</b>	<b>.23</b>	<b>.20</b>	<b>.37</b>	<b>.25</b>	<b>.14</b>	<b>.23</b>	<b>.46</b>	<b>-.17</b>	<b>-.11</b>	<b>.12</b>	<b>.25</b>	<b>.25</b>	<b>.26</b>	<b>.22</b>	<b>.26</b>	—
<i>M</i>	41.52	1.46	1.89	2.91	3.05	2.80	2.78	3.13	2.77	2.55	2.26	9.62	2.83	3.01	2.87	2.84	3.18	2.73	2.31	2.21	8.48
<i>SD</i>	9.12	0.50	0.31	0.57	0.55	0.67	0.88	0.56	0.92	0.94	0.55	13.76	0.66	0.49	0.69	0.90	0.63	0.92	0.96	0.54	9.86
<i>α</i>																					

Note.  $N = 225$ .<sup>a</sup>Gender (1 = female, 2 = male).<sup>b</sup>Working time status (1 = part-time, 2 = full-time). Descriptive statistics of absence data represent non-transformed scores.  
Numbers in bold  $p < .05$  (two-tailed test).

### Sample 2

Table 4 shows the standardized estimations of the outcome stabilities and of the lagged effects of the biographical variables and the job characteristics as well as the indirect effects of workload for the sample of the financial service institution. Again, the cross-lagged panel SEM showed a good data approximation ( $\chi^2 (354) = 441.89, p < .01$ , RMSEA = .033, CI<sub>90%</sub> = .022–.043, SRMR = .033, gamma hat = .976, CFI = .978). After partialling stabilities of the outcomes, SCDs at Time 1 predicted exhaustion, anxiety, and sum of days absent at a later point in time. As in Sample 1, the longitudinal path from SCDs at Time 1 to depersonalization at Time 2 was not significant. Only emotional dissonance at Time 1 was related to depersonalization at Time 2. Finally, age was negatively associated with sum of days absent at Time 2.

SCDs at Time 1 mediated the longitudinal relations of workload at Time 1 to exhaustion (Hypothesis 1a), anxiety (Hypothesis 1c), and sum of days absent (Hypothesis 1d). Workload at Time 1 did not exert lagged indirect effects on depersonalization at Time 2 through SCDs at Time 1. To sum up, SEM analyses of the data from Sample 2 revealed that SCDs exerted mediator effects on exhaustion, anxiety, and sum of days absent at Time 2.

**Table 3.** Standardized results from structural equation analyses (cross-lagged panel) predicting emotional exhaustion (Time 2) and depersonalization (Time 2) in Sample 1

Latent independent variables	Emotional exhaustion (Time 2)		Depersonalization (Time 2)	
	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
<b>I. Biographical variables</b>				
Age	.05	.04	.05	.03
Gender <sup>a</sup>	.01		.06	
Working time status <sup>b</sup>	−.01		−.04	
<b>2. Inter-individual stability</b>				
Outcome (Time 1)	.58**	.54	.52**	.44
<b>3. Resources (Time 1)</b>				
Job control	−.07	.00	.02	.00
Social support	−.01		.02	
<b>4. Demands (Time 1)</b>				
Workload	.03	.11	.14	.00
Emotional dissonance	.09		.13	
Self-control demands	.22**		−.05	
$R^2$	.65**	.46**		
Effects of workload (Time 1) <sup>c,d</sup>	$\beta_{\text{ind}}$	95% CI <sup>e</sup>	$\beta_{\text{ind}}$	95% CI <sup>e</sup>
Indirect effect	.10*	.02, .18	−.02	−.12, .10
Direct effect on SCDs (Time 1)	.42**			

Note. N = 174.

<sup>a</sup>Coding: 1 = female, 2 = male.

<sup>b</sup>Coding: 1 = part-time, 2 = full-time.

<sup>c</sup>Controlling for all other independent variables.

<sup>d</sup>Bootstrap sample size = 1,000.

<sup>e</sup>95% Confidence interval, bias corrected and accelerated, first (second) value representing lower (upper) limit.

\* $p < .05$ . \*\* $p < .01$  (two-tailed test). SCD, self-control demand.

### Additional analyses

#### Reverse causation

To exclude the possibility of reverse causation, we examined lagged effects of psychological strain (and absenteeism) on job characteristics after controlling for biographical variables and stability. In both samples, neither psychological strain nor absenteeism (Sample 2) at Time 1 predicted job resources and job demands at Time 2. Thus, in line with prior studies (Schaufeli *et al.*, 2009; Zapf *et al.*, 1996), these results suggest that neither strain nor absenteeism influences job characteristics.

#### Mediating effects of SCDs at Time 2

Our results might be criticized because mediating effects can only be tentatively tested in a two-wave design. This criticism is emphasized by the fact that within-time effects at

**Table 4.** Standardized results from structural equation analyses (cross-lagged panel) predicting emotional exhaustion (Time 2), depersonalization (Time 2), anxiety (Time 2), and sum of days absent (Time 2) in Sample 2

Latent independent variables	Emotional exhaustion (Time 2)		Depersonalization (Time 2)		Anxiety (Time 2)		Sum of days absent (Time 2)	
	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
<b>I. Biographical variables</b>								
Age	.05	.05	-.12	.11	.07	.03	-.13*	.03
Gender <sup>a</sup>	-.05		.04		.03		-.09	
Working time status <sup>b</sup>	.06		.02		.07		-.07	
<b>2. Inter-individual stability</b>								
Outcome (Time 1)	.56**	.47	.76**	.67	.62**	.58	.39**	.20
<b>3. Resources (Time 1)</b>								
Job control	-.01	.02	-.05	.00	-.05	.03	-.07	.05
Social support	.03		.00		.00		.00	
<b>4. Demands (Time 1)</b>								
Workload	.00	.05	-.04	.03	.00	.02	.05	.06
Emotional dissonance	.08		.21*		.07		.04	
Self-control demands	.24*		.02		.19*		.27**	
$R^2$	<b>.59**</b>		<b>.81**</b>		<b>.66**</b>		<b>.34**</b>	
Effects of workload (Time 1) <sup>c,d</sup>	$\beta_{\text{ind}}$	95% CI <sup>e</sup>	$\beta_{\text{ind}}$	95% CI <sup>e</sup>	$\beta_{\text{ind}}$	95% CI <sup>e</sup>	$\beta_{\text{ind}}$	95% CI <sup>e</sup>
Indirect effect	.17*	.02, .32	.02	-.15, .19	.15*	.01, .29	.20**	.06, .34
Direct effect on SCDs (Time 1)	.65**							

Note. N = 225.

<sup>a</sup>Coding: 1 = female, 2 = male.

<sup>b</sup>Coding: 1 = part-time, 2 = full-time.

<sup>c</sup>Controlling for all other independent variables.

<sup>d</sup>Bootstrap sample size = 1,000.

<sup>e</sup>95% Confidence interval, bias corrected and accelerated, first (second) value representing lower (upper) limit.

\* $p < .05$ . \*\* $p < .01$  (two-tailed test). SCD, self-control demand.

Time 1 are often misspecified and can lead to biased estimations (Toppinen-Tanner, Kalimo, & Mutanen, 2002). To provide an additional test, we replicated our analyses specifying SCDs at Time 2 as the mediator. In Sample 1, after controlling for biographical differences, stabilities, and job characteristics, SCDs at Time 2 were found to mediate the longitudinal relation of workload at Time 1 to exhaustion at Time 2. In Sample 2 (same procedure), the longitudinal relations of workload at Time 1 to exhaustion, anxiety, and absenteeism (at Time 2) were found to be mediated by SCDs at Time 2. However, we decided to focus on mediating effects of SCDs at Time 1 because, theoretically, employees are expected to engage in self-control *immediately*, when workload is high. That is, the experience of high SCDs should temporarily coincide with increasing workload. In contrast, a model with SCDs at Time 2 would draw on the assumption that employees respond to high workload 1 or 2 years later. In testing mediator effects of SCDs at Time 1, we carefully considered specification requirements (correlations among independent variables and among error variables) and did not find any indication for biased estimations (Kline, 1998, p. 139, 258).

## Discussion

In this study, we sought to clarify whether SCDs mediate the relations of workload to psychological strain and absenteeism. This prediction draws on the theoretical notion that regulation of goal-directed behaviour at work involves volitional self-control (Hacker & Richter, 1990; Robinson *et al.*, 2010). In two different samples, analyses of cross-lagged panel SEM indeed revealed that SCDs exert mediator effects in the longitudinal relationship between workload and exhaustion, anxiety, and sum of days absent after partialling biographical influences, outcome stability, and relevant job characteristics (emotional dissonance, social support, and job control). Finally, the use of two longitudinal samples from different occupational contexts as well as different time intervals between the waves (12 and 24 months) provides evidence for the generalizability of our results and thus emphasizes the role of SCDs in the development of psychological strain and absenteeism.

The results of this study provide some contribution to our theoretical understanding of stress at work. First, workload and emotional dissonance were strongly related to psychological strain at Time 2, especially exhaustion. After partialling outcome stabilities, the effects of both stressors on psychological strain at Time 2 were annihilated. We should emphasize that emotional dissonance and workload have also been hypothesized to draw on a single cognitive resource that is depleted by self-control acts (Diestel & Schmidt, 2009, 2011a,b). Given the finding that exhaustion and anxiety at Time 1 seem to mediate the adverse effects of both stressors, our results provide further support for the notion that several job characteristics exert their adverse effects through resource depletion. In developing their model of self-control strength, Muraven and Baumeister (2000, p. 248) proposed that repeated resource depletion might result in chronic resource deficits and impairments of self-control. Although the authors did not elaborate on this proposition, McEwen (2000) provided a more thorough explanation for why stressful and depleting processes such as volitional self-control increase psychological strain. According to his allostatic load model, prolonged and sustained activation of the human stress response system (allostatic load) increases the risk of psychosomatic diseases, such as depression, anxiety, and other symptoms related to burnout (Danhof-Pont, Veen, & Zitman, 2011). In experimental studies, self-control acts have been repeatedly found to induce high heart

rate, low blood glucose levels, and high blood pressure indicating allostatic load (Gailliot *et al.*, 2007; Segerstrom & Solberg Nes, 2007).

Furthermore, and extending the conclusion above, the reported mediator effects of SCDs provide more insights into the mechanism through which workload in terms of concentration requirements and work pressure results in psychological strain and absenteeism. Consistent with Robinson *et al.* (2010), regulation of goal-directed behaviour involves volitional self-control and thus SCDs as job-related requirements that are closely related to the processes of behavioural regulation explain the adverse effects of workload. Consequently, SCDs reflect the extent to which job-related requirements (e.g., workload) prompt employees to engage in volitional self-control at work and drain their limited volitional resource. This implication is further supported by the finding that the longitudinal relations of SCDs to exhaustion and anxiety were also (to a lesser extent) annihilated after controlling for outcome stabilities. That is, SCDs can be thought of as a stressor that induces chronic allostatic load through repeated resource depletion.

Third, a measure of absenteeism reflected lagged indirect effects of workload through SCDs. As Johns (1997, 2009) pointed out, the relation between workload and absenteeism is more complicated and intervening processes should be considered to disentangle the stress-absence relationship. The mediator effects of SCDs suggest that resource depletion and failure of volitional self-control may explain why employees tend to 'take a sickie' when workload is high. Results on increases in drug abuse (Frone, 2008), counterproductive behaviour (Marcus & Schuler, 2004), and bullying at work (Hauge, Skogstad, & Einarsen, 2007) support the argument that behavioural outcomes of workload can also be interpreted as a form of self-control failure due to resource depletion (Hagger *et al.*, 2010).

Some limitations of our study need to be discussed. First, in both samples, depersonalization failed to reflect any lagged effect of SCDs. However, in previous cross-sectional studies, SCDs have been consistently found to relate to depersonalization (Schmidt, 2010; Schmidt & Neubach, 2007). One possible explanation might be that depersonalization as a behavioural manifestation of burnout experience (Maslach, Schaufeli, & Leiter, 2001) does not constitute a form of psychological strain, but rather represents a maladaptive coping strategy aiming at reducing feelings of exhaustion (Diestel & Schmidt, 2010; Hobfoll & Freedy, 1993). Thus, although cross-sectional analyses may reveal a short-term effect of SCDs on depersonalization that is used to cope with work stress, longitudinal studies may demonstrate that, in the long run, interpersonal or emotional stress such as emotional dissonance determines cynicism or alienation that ultimately represents inner resignation or withdrawal from emotional stress rather than from other forms of stress (Halbesleben, 2006). Furthermore, most of the study variables were operationalized through self-report measures. Thus, common method variance or a self-report bias might have contaminated the relations found (Podsakoff, MacKenzie, Podsakoff, & Lee, 2003). However, using an absence measure that reflected a similar pattern of effects, as did the self-report measures of strain, and the panel design largely limited the risk of mutual contamination of the constructs (de Jonge & Dormann, 2006). Finally, the theoretical argument that high workload exerts its adverse effects on strain through overtaxing regulation of goal-directed behaviour that involves exerting self-control refers to an event-level process. Thus, our arguments call for experience sampling methodology or an experimental design (Kühnel, Sonnentag, & Bledow, 2012; Ohly, Sonnentag, Niessen, & Zapf, 2010). Indeed, as past research demonstrates, high SCDs and workload result in psychological strain *over longer time periods* (Kehr, 2004; Oaten & Cheng, 2005). Thus, the theorized

event-level process is not only limited to immediate strain experiences but also has long-term effects on the between-person level. Nevertheless, future research should also test mediating effects of self-control as a within-person-level variable on the relationship between stable job characteristics and corresponding strain experience varying across the day or week.

The present results should be considered from a perspective of potential protective resources that might mitigate the adverse effects of work stress. On the organizational level, the well-established job demands-control model (Karasek, 1979; Häusser *et al.*, 2010) suggests to increase job control as a resource that has been repeatedly proven to attenuate the positive relations of workload and SCDs to psychological strain and absenteeism (Schmidt & Diestel, 2011). Moreover, according to the idea of affective commitment as a psychological bond, highly committed employees have been revealed to be less susceptible to the adverse effects of work stress as compared with those reporting low levels of commitment (Schmidt & Diestel, *in press*). Additionally, emotional job resources (such as emotional support; de Jonge, Le Blanc, Peeters, & Noordam, 2008) also mitigate the relations of stress to strain. On the individual level, self-efficacy (Heuven, Bakker, Schaufeli, & Huisman, 2006) and emotional competence (Giardini & Frese, 2006) are strong moderators that prevent employees from strain in case of high stress. Finally, an effective approach of intervention might be a training programme that aims at strengthening self-control capacity (Schmidt *et al.*, 2012; Tangney, Baumeister, & Boone, 2004). Experimental results suggest that successive training of action regulation results in an increase in the ability to exert self-control in different behavioural domains (Oaten & Cheng, 2006, 2007). Provided that such a training programme does not overtax limited resources and thus cause chronic allostatic load, such an intervention should facilitate coping with SCDs and workload. Moreover, the training concept developed by Latham and Frayne (1989) may provide important practical recommendations in this regard. Especially, when preventing absenteeism, different volitional strategies, such as specific goal-setting, self-monitoring, and behavioural contracts, foster attendance behaviour and may compensate for low self-control strength or high SCDs.

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