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Medical doctors taking the lead: transforming workplaces towards sustainable employability

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CHAPTER 4

Sustainable employability of Dutch medical doctors: A test of the role of psychosocial safety climate in the job demands-resources model

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Abstract

Compromised Sustainable Employability (SE) of medical doctors poses a risk to the viability of healthcare, and consequently, to society's welfare. In order to address medical doctors' compromised SE a better understanding of its underlying determinants is needed. Therefore, drawing on the Job Demands-Resources (JD-R) model, extended with Psychosocial Safety Climate (PSC), we tested PSC as a 'cause of causes', examining direct and indirect relationships between PSC, job characteristics (job demands and job resources), and SE outcomes (burnout, work engagement, and job satisfaction). We also tested whether PSC moderates job characteristics-SE relationships. Multilevel structural equation modelling was used to analyse questionnaire data from 604 medical doctors across 28 groups. PSC was analysed at the group-level, while other variables were analysed at the individual-level. Results showed that job demands and job resources were related to SE outcomes, generally in line with the JD-R model. PSC was particularly positively related to job resources and negatively to the job demand social harassment. We found some support for indirect relationships between PSC and SE outcomes through job characteristics, as well as PSC's moderating role on job characteristics-SE relationships. Surprisingly, under high PSC, unfavourable job characteristics were associated with more negative SE outcomes. These findings suggest that healthcare organisations can enhance medical doctors' SE by fostering a high PSC and designing favourable job characteristics.

Introduction

Global healthcare system faces major challenges with an ageing population that needs care (WHO, 2022). Medical doctors, who are vital to the healthcare system's viability, are facing an anticipated shortage of around ten million medical personnel by 2030 (Boniol et al., 2022). This makes it imperative for healthcare organisations to promote medical doctors' Sustainable Employability (SE). SE, which refers to employees' ability to function at work in the long-term, is characterised by the absence of burnout and the presence of work engagement and job satisfaction, and is important to deal with these challenges (Fleuren et al., 2020). Yet, there are serious concerns regarding preserving medical doctors' SE. That is, medical doctors face tremendous pressure and a lack of resources because of the changing, more demanding, and complex healthcare system (Rothenberger, 2017). This is evidenced by burnout prevalence rates that are skyrocketing (West et al., 2018). Illustrative is the finding that roughly half of U.S. medical doctors met criteria for burnout (Shanafelt et al., 2015). Additionally, many medical doctors experienced low work engagement (Rao et al., 2020). Although overall job, work or career satisfaction among U.S. medical doctors seems to have remained moderate to high, current global healthcare changes could have substantial implications for this (Hoff et al., 2015). Compromised medical doctors' SE not only negatively affects their health, but also their performance, motivation, and quality of care (Swensen et al., 2016; West et al., 2018).

Compromised medical doctors' SE has prompted calls to a deeper understanding of its determinants, which is crucial for developing structural interventions aimed at enhancing SE. The Job Demands-Resources model (JD-R model), extended with the organisational resource Psychosocial Safety Climate (PSC), provides a useful framework for this understanding (Dollard & Bakker, 2010). This framework suggests that high PSC and favourable job characteristics can potentially enhance SE. Indeed, earlier studies demonstrated that specific job characteristics can predict burnout in medical doctors (e.g., West et al., 2018). However, the potential associations between job characteristics and positive SE indicators, such as work engagement and job satisfaction, were previously only scarcely examined (e.g., Domagała et al., 2018; Swensen et al., 2016). Moreover, these studies did not consider PSC. This means that the role of the work environment in medical doctor's SE is not fully understood, hindering the development of theoretically sound organisational-level interventions. Hence, this study aims to provide a more comprehensive perspective of medical doctors' work environment in relation to SE. Specifically, by drawing on the JD-R model extended with PSC as a theoretical framework, we will examine antecedents of medical doctors' SE (i.e., burnout, work engagement, and job satisfaction), including job

characteristics and PSC, in a large sample across various organisational settings (see Figure 1 for the hypotheses).

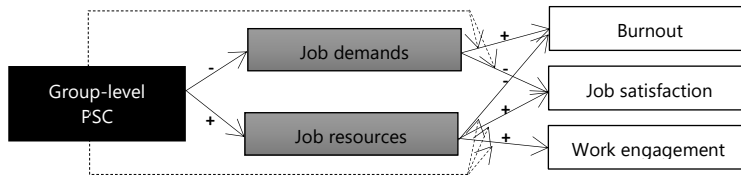


Figure 1. Hypotheses of the study. **Note.** PSC = psychosocial safety climate.

Theoretical framework

Sustainable Employability

SE is defined as: 'an individual's ability to function at work and in the labor market, or their "employability", is not negatively, and preferably positively, affected by that individual's employment over time' (Fleuren et al., 2020, p. 15). Burnout, work engagement, and job satisfaction are three relevant SE indicators that can collectively determine whether medical doctors can function at work in the long-term. The first SE indicator, burnout, is defined as: 'a work-related state of exhaustion that occurs among employees, which is characterised by extreme tiredness, reduced ability to regulate cognitive and emotional processes, and mental distancing' (Schaufeli et al., 2020, p. 4). It reflects medical doctors' energy depletion due to the cumulative impact of physical and/or mental effort at work, which impacts medical doctors' ability to engage in work activities in the long term (Fleuren et al., 2020). The second SE indicator, work engagement, is defined as: 'a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication, and absorption' (Schaufeli & Bakker, 2004b, p. 295). The last SE indicator, job satisfaction, is defined as: 'a positive (or negative) evaluative judgement one makes about one's job or job situation' (Weiss, 2002, p. 175). Both are relevant SE indicators, as they reflect medical doctors' willingness to engage in work activities in the long-term, which is affected by work environment satisfaction and needs fulfilment (Fleuren et al., 2020). Thus, all three SE indicators are relevant for medical doctors to sustainably function at work.

The Job Demands-Resources model and Sustainable Employability

The JD-R model, a key theory for understanding SE (Bakker & Demerouti, 2017), classifies the work environment (i.e., job characteristics) into job demands and job resources. Job demands are aspects of work that require sustained effort and are related to physiological and/or psychological costs, while job resources help reduce these demands, achieve work goals, and foster personal growth (Schaufeli & Bakker, 2004b). The JD-R model posits

that manageable job demands and high job resources is ideal for preserving employees' energy and motivation, both of which are essential for sustained participation in work. In fact, a dual process is proposed: 1) a health impairment process in which excessive job demands and lack of job resources increase burnout and (2) a motivational process in which job resources stimulate work engagement and job satisfaction (Schaufeli, 2017; Schaufeli & Bakker, 2004b). There is ample evidence to support this dual process (Bakker & Demerouti, 2017; Lesener et al., 2019). Research findings on the relationship between job demands and positive SE outcomes are more inconsistent. For work engagement, no, negative or positive relationships were found, indicating that job demands can be both stressful and motivating (e.g., Crawford et al., 2010). More consistent support has been found for a relationship between high job demands and low job satisfaction, especially in high stress fields like healthcare (Fila et al., 2017).

The JD-R model has also been widely studied among medical doctors, primarily to understand burnout. Research showed that high job demands (e.g., administrative duties, high patient caseload, work overload, and emotional demands) and low job resources (e.g., lack of internal communication, opportunities for development, and social support) increase medical doctors' burnout (Patel et al., 2018; Rothenberger, 2017; West et al., 2018). Furthermore, research found that job demands reduce medical doctors' job satisfaction, while job resources enhance it (Domagała et al., 2018; Hoff et al., 2015), and high job resources enhance medical doctors' work engagement (Mache et al., 2014; Shanafelt & Noseworthy, 2017; Swensen et al., 2016). Despite this, the factors driving work engagement and job satisfaction in medical doctors remain less explored compared to burnout. Therefore, this study contributes to the literature by examining if job demands and job resources relate to both negative (i.e., burnout) and positive (i.e., work engagement and job satisfaction) SE indicators in medical doctors. Based on previous research, we expect (see Figure 1 for the study's hypotheses):

Hypothesis 1a: lower job demands will be associated with lower burnout and higher job satisfaction.

Hypothesis 1b: higher job resources will be associated with lower burnout, higher job satisfaction, and higher work engagement.

Furthermore, given the unequivocal findings on the job demands-work engagement relationship, we conduct an exploratory examination of these relationships.

The role of PSC in the JD-R model

How can it be prevented that job characteristics lead to negative SE outcomes? PSC could be significant in this context. PSC has been added to the JD-R model as a 'cause of causes', which means that it is considered as an antecedent of job characteristics, and as a moderator in job demands and resources-burnout relationships (Dollard & Bakker, 2010). PSC is proposed as an organisational resource and is defined as employees' shared perceptions of organisational policies, practices, and procedures to protect employees' psychological health and safety (Dollard & Bakker, 2010). PSC takes place across five domains: top management priority, direct supervisor support and commitment, group norms and behaviour, organisational communication, and organisational participation and involvement (Bronkhorst, 2015; Bronkhorst & Vermeeren, 2016). In this sense, organisations with high PSC prioritise the protection of employees' psychological health and safety (and thus SE), thereby intending to design favourable work environments (i.e., avoiding overdemanding and providing adequate resources) through their policies, practices and procedures (Dollard et al., 2012; Dollard & Bakker, 2010). Indeed, previous studies have shown that PSC decreased job demands, while job resources were increased (e.g., Dollard et al., 2012; Dollard & Bakker, 2010; Idris & Dollard, 2011). Given these previous findings, we also predict these relationships among medical doctors:

Hypothesis 2: Higher PSC will be associated with lower job demands (2a) and higher job resources (2b).

Additionally, PSC is proposed as a 'cause of causes', acting as a distal antecedent of burnout and work engagement through its influence on job characteristics (Dollard & Bakker, 2010; Yulita et al., 2017). High PSC organisations are more likely to foster well-designed jobs by establishing policies, practices, and procedures that maintain job demands at manageable levels, thereby reducing burnout (Dollard & Bakker, 2010). For example, management might optimise electronic health records, to address medical doctors' overly demanding situations (West et al., 2018). Such organisations are also more likely to offer adequate job resources (Dollard & Bakker, 2010), such as opportunities for development, which enhances the meaningfulness of medical doctors' work (West et al., 2018). Drawing on social exchange theory, Dollard and Bakker (2010) proposed that employees who perceive organisational support for their work and health are more likely to experience higher engagement and satisfaction. These resources can also help manage job demands, thereby reducing burnout, for instance by ensuring efficient work procedures that enable medical doctors to better handle their high workload (West et al., 2018). Indeed, previous studies have shown that high PSC decreased burnout and increased work engagement via decreased job demands and increased job resources, among

various occupational groups (e.g., Dollard et al., 2012; Dollard & Bakker, 2010; Idris et al., 2015; Idris & Dollard, 2011; Law et al., 2011; Yulita et al., 2017). Although these earlier studies provide insight into PSC's role as a 'cause of causes', this role is not yet well understood among medical doctors. Therefore, the current study contributes to the existing literature by examining indirect relationships between PSC and a negative and positive SE indicators through a comprehensive selection of medical doctors' relevant job demands and job resources. We expect:

Hypothesis 3a: Higher PSC will be indirectly associated with lower burnout and higher job satisfaction through its association with lower job demands.

Hypothesis 3b: Higher PSC will be indirectly associated with lower burnout and higher job satisfaction and higher work engagement through its association with higher job resources.

Furthermore, we exploratorily examined the indirect relationship between PSC and work engagement through job demands.

The JD-R model, extended with PSC, also posits PSC as a moderator in the health impairment process (Dollard & Bakker, 2010). In high PSC organisations, supportive policies, practices and procedures, and resources are more available and encouraged to manage job demands (Dollard & Bakker, 2010; Loh et al., 2018). For example, medical doctors are encouraged to use psychological counselling after an emotional situation with a patient. According to the Conservation of Resources (COR) theory (Hobfoll, 1989), employees with greater job resources are less vulnerable to job resources loss. As PSC is a key organisational-level resource, PSC may buffer the effects of low job resources and high job demands on burnout. Studies have shown that PSC buffers the negative impact of job demands on emotional exhaustion across various occupations (Dollard & Bakker, 2010; Law et al., 2011; Loh et al., 2018). However, PSC did not buffer the negative impact of low job resources on emotional exhaustion, despite being proposed as a compensation for low personal job resources (Dollard & Bakker, 2010). Earlier studies imply PSC is better understood as a buffer for high job demands than for low job resources in relation to burnout. Furthermore, PSC is not yet explored as a buffer in the high job demands-low job satisfaction relationship or as a booster in the motivational process. According to the COR theory (Hobfoll, 1989), employees who possess job resources are more capable of orchestrating resource gain. Based on this, we propose that PSC might also boost the relationships between job resources, work engagement and job satisfaction. High PSC organisations make job resources more accessible and encourage their use, thereby reducing threats, which can enhance employees' position and motivation to

acquire additional resources, as well as improving their work engagement and job satisfaction. Therefore, we will examine whether PSC buffers or boosts the relationships between medical doctors' job characteristics and SE indicators. We expect, based on the hypothesised role of PSC in the JD-R model:

Hypotheses 4a: PSC will buffer the relationships between job demands and burnout and job satisfaction.

Hypothesis 4b: PSC will boost the relationships between job resources and burnout, job satisfaction and work engagement.

Furthermore, we exploratorily examined whether PSC would buffer the impact of job demands on work engagement.

Method

Procedure and sample

The current investigation used data of the baseline measurement of a study examining the effects of an organisational-level workplace intervention to enhance SE in groups of Dutch medical doctors and allied healthcare professional groups. The groups self-selected for participation in the intervention. At the baseline measurement, medical doctors and allied healthcare professionals were asked to fill out an online questionnaire. The intervention study was approved by the ethical board of Leiden university (registration numbers: 29 September 2020, V2–2611; 4 April 2023, V3–4509) and was pre-registered (registration number: ISRCTN15232070).

The sample consisted of 26 groups of medical doctors, who worked in a variety of settings (i.e., hospital departments, municipal health centres, geriatrics, and intellectual disability-, mental health-, general practitioner-, rehabilitation- and addiction care) and two groups of allied healthcare professionals (i.e., hospital pharmacists) ($N = 28$ groups). For readability, the term 'medical doctors' refers to both medical doctors and allied healthcare professionals. In total, $N = 825$ medical doctors were asked to fill out the baseline questionnaire. Of these, 73.2% ($n = 604$) fully completed the baseline questionnaire, 2.4% ($n = 20$) partially completed it, and 24.4% ($n = 201$) did not respond at all. We included partial responses from respondents who at least completed the primary outcome job satisfaction. Depending on the extent to which respondents completed the baseline measurement, our final sample varied between $N = 608$ and $N = 613$ medical doctors per outcome (response rate 74%), nested in 28 groups. The response rate per group varied between 49% and 100%.

Of the final sample who fully completed the baseline questionnaire ($n = 604$), 74% were females and 26% were males. The proportion of respondents younger than 30 years old was 7%; 60% was between 30 and 49 years old; and 33% was 50 years and older. The mean years of experience in their current position was 11.1 years ($SD = 9.3$). Most respondents (85%) had a permanent contract and 15% a temporary contract. Most respondents had an employment contract between 0.6 and 1.0 FTE (92%), and relatively a small group had a contract for less than 0.6 FTE (8%).

Measures

Psychosocial Safety Climate (PSC)

Psychosocial safety climate (PSC) was assessed using the Psychosocial Safety Climate Survey (PSC-12 scale) (Dollard & Bakker, 2010; Hall et al., 2010), extended with group norms and behaviour and differentiation between management layers (i.e., top management and direct supervisor) (based on Bronkhorst, 2015; Bronkhorst & Vermeeren, 2016). Five PSC subscales were measured (15 items; 5-point Likert-scale; 1 = *totally disagree*, 5 = *totally agree*): top management priority (e.g., 'Psychological well-being of staff is a priority for this organisation'), direct supervisor support and commitment (e.g., 'My direct supervisor acts decisively when a concern regarding an employees' psychological status is raised'), group norms and behaviour (e.g., 'In our workplace, we remind each other of the rules and regulations regarding psychological stress'), organisational communication (e.g., 'My contributions to resolving occupational health and safety concerns in the organisation are listened to'), and organisational participation and involvement (e.g., 'Participation and consultation in psychological health and safety occurs with employees, works councils and health and safety coordinators'). An overall PSC score was calculated by averaging the scores of the five subscales, a higher score reflected a higher PSC. The reliability of PSC in the current study was good ($\alpha = .91$). PSC was aggregated to group-level PSC (see statistical analyses).

Job demands

Job demands were measured by the medical doctor version of the Leiden Quality of Work Questionnaire (LQWQ) (Gelsema et al., 2005; Maes et al., 1999; Van der Doef & Maes, 1999), extended with items based on the Demand-Induced Strain Compensation Recovery Questionnaire (DISQ) (De Jonge et al., 2009) and the Questionnaire on the Experience and Evaluation of Work (QEEW) (Veldhoven et al., 2015). The five job demands (4-point Likert-scale; 1 = *totally disagree*, 4 = *totally agree*) were time pressure (6 items; $\alpha = .74$; e.g., 'During my shift, I am responsible for the care of too many patients'), cognitive demands (5 items; $\alpha = .85$; e.g., 'My job requires a lot of concentration'),

emotional demands (4 items; $\alpha = .74$; e.g., 'My job is emotional demanding'), physical demands (5 items; $\alpha = .67$; e.g., 'I have to stand a lot for my job'), and social harassment (4 items; $\alpha = .90$; e.g., 'In my department, some employees are belittled and/or ridiculed').

Job resources

In total 12 job resources were measured. Of these, 11 job resources were measured by the medical doctor version of the LQWQ (Van der Doef & Maes, 1999): autonomy (4 items; $\alpha = .62$; e.g., 'I can decide for myself when I engage in patient-related versus non-patient-related tasks'), social support from supervisor (4 items; $\alpha = .91$; e.g., 'I feel appreciated by my supervisor'), social support from colleagues (4 items; $\alpha = .87$; e.g., 'I feel appreciated by my colleagues'), work procedures (4 items; $\alpha = .84$; e.g., 'In my department, procedures and rules are often unclear' (recoded)), role clarity (4 items; $\alpha = .82$; e.g., 'I exactly know my responsibilities'), opportunities for development (4 items; $\alpha = .87$; e.g., 'My job requires that I learn new things'), staffing levels (5 items; $\alpha = .80$; e.g., 'In my department, there are enough medical doctors to provide good patient care'), equipment and material (3 items; $\alpha = .81$; e.g., 'Materials, equipment and/or instruments are not always available when necessary' (recoded)), internal communication (4 items; $\alpha = .72$; e.g., 'In this organisation, one must ask a question repeatedly before getting an answer' (recoded)), (financial) rewards (6 items; $\alpha = .79$; e.g., 'Medical doctors are not sufficiently valued within this organisation' (recoded)), and recovery within worktime (4 items; $\alpha = .49$; e.g., 'If I want to I can leave my workplace for a short while'). Given the low reliability of the scale recovery within worktime, an item (i.e., 'During my break(s), I need to be available for emergencies') was excluded based on item-total correlation, yielding an alpha of .58 for the 3-item scale. The job resource team reflexivity (5-point Likert-scale; 1 = *totally disagree*, 5 = *totally agree*; 6 items; $\alpha = .88$; e.g., 'In this team the results of actions are evaluated'), was assessed using the measure of Schippers et al. (2005).

Indicators of Sustainable Employability (SE)

Three indicators of SE were assessed: burnout, job satisfaction, and work engagement. Burnout was assessed with the work-related version of the Burnout Assessment Tool (BAT) (23 items; 5-point Likert-scale; 1 = *never*, 5 = *always*) (Schaufeli et al., 2020). An average overall burnout score ($\alpha = .94$) was calculated from the four core burnout complaints emotional exhaustion (e.g., 'After a day at work, I find it hard to recover my energy'), mental distance (e.g., 'I struggle to find any enthusiasm for my work'), cognitive impairment (e.g., 'At work, I have trouble staying focused'), and emotional impairment (e.g., 'I do not recognise myself in the way I react emotionally at work'). Job satisfaction was assessed using 3 items of the medical doctor version of the LQWQ (e.g., 'I am satisfied

with my job') (Van der Doef & Maes, 1999). The reliability of job satisfaction was good ($\alpha = .75$). Work engagement was assessed using the Utrecht Work Engagement Scale (UWES-9) (9 items; 7-point Likert-scale; 1 = *never*, 7 = *daily*) (Schaufeli & Bakker, 2004a). An average overall work engagement ($\alpha = .93$) score was calculated from the three subscales vigour (e.g., 'When I get up in the morning, I feel like going to work'), dedication (e.g., 'My job inspires me'), and absorption (e.g., 'I feel happy when I am working intensely').

Statistical analysis

In line with the recommendations of Dollard et al. (2012) and Dollard and Bakker (2010), we analysed PSC at the group-level, as a reflection of employees' shared perceptions of the organisational climate. We therefore aggregated the individual PSC scores of the medical doctors to a group-level PSC score. This aggregated group score was attributed to all individual medical doctors within a medical doctor group. To verify the group-level PSC score, we calculated the Intraclass Correlation Coefficient $ICC(1)$ to assess the proportion of the total variance in PSC explained by medical doctor groups, and $ICC(2)$ to assess the reliability of the aggregated PSC score. For the $ICC(2)$ we used the threshold of .70, indicating good reliability (Nunnally, 1978). Furthermore, we calculated the James et al. (1984) mean $r(WG)(j)$ agreement index to assess the within group agreement, and performed an one-way random effects ANOVA with the predictor PSC at the individual-level and medical doctor groups as the between-person factor. PSC was thus aggregated at the group-level (Level 2), and job characteristics and SE indicators were measured at the individual-level (Level 1).

Some items of the job demand time pressure and the job resource autonomy referred to direct contact with patients and were not applicable to a small group of medical doctors ($n = 17$ and $n = 22$, respectively). For these respondents, a time pressure score and an autonomy score were computed based on the items that were filled out, with a minimum requirement of three out of six items for time pressure and two out of four items for autonomy.

As medical doctors (Level 1) were nested within groups (Level 2), we performed Multilevel Structural Equation Modelling (MSEM) in R to test the proposed relationships. We tested one model for each SE indicator separately (Model 1 for burnout; Model 2 for job satisfaction; Model 3 for work engagement) to examine the direct relationships between job demands and the respective SE indicator (Hypothesis 1a), as well as the direct relationships between PSC and job demands (Hypothesis 2a), and the indirect relationships between PSC and the respective SE indicator via job demands (Hypothesis

3a) (see Table 2). We added covariances for each combination of job demands in these two models. Furthermore, we tested one model for each SE indicator separately (Model 4 for burnout; Model 5 for job satisfaction; Model 6 for work engagement) to examine the direct relationships between job resources and a SE indicator (Hypothesis 1b), the direct relationships between PSC and job resources (Hypothesis 2b), and the indirect relationships between PSC and a SE indicator via job resources (Hypothesis 3b) (see Table 2). We added covariances for each combination of job resources in the three models. To determine the type of mediation of the six models, we used the mediation decision tree of Zhao et al. (2010). Finally, to test the final hypothesis regarding the moderating effect of PSC, we performed MSEM with moderation-effects. We centered PSC and job characteristics (i.e., each job demand and job resource) and created interaction terms. Three models were tested to examine whether PSC moderates the relationships between job demands and each SE indicator (Model 7 for burnout; Model 8 for job satisfaction; Model 9 for work engagement) (Hypothesis 4a), and three models were tested to examine whether PSC moderates the relationship between job resources and each SE indicator (Model 10 for burnout; Model 11 for job satisfaction; Model 12 for work engagement) (Hypothesis 4b). Relative fit indices, Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA), were used to determine the models fit. For the CFI, we considered cut-off values above .95 as a good fit (Hu & Bentler, 1999). Further, RMSEA values less than .05 indicated a good fit and RMSEA values between .05 and .10 indicated an acceptable fit (Browne & Cudeck, 1992).

Results

The means, standard deviations, and correlations of the variables under study are presented in Table 1. The mean $r(WG)(j)$ agreement index of PSC was .96, ranging between .92 and .98, indicating homogeneity of medical doctors' perceptions within groups. One-way random effects ANOVA demonstrated significant between-group variance, $F(27,576) = 3.91, p < .001$. The $ICC(1)$ of PSC was .16, suggesting that 16% of the variability in PSC can be attributed to variations between groups of medical doctors. The $ICC(2)$ for PSC was .71, achieving the threshold value of .70 (Nunnally, 1978). These findings justified the aggregation of PSC to the group-level.

Chapter 4

Table 1. Study variable descriptives and correlations

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. PSC (group-level)	2.94	0.23	-																			
2. TP	2.73	0.44	-.08	-																		
3. CD	3.27	0.44	-.07	.31**	-																	
4. ED	2.86	0.48	-.08*	.28**	.34**	-																
5. PD	2.08	0.48	-.16**	.06	.11**	.38**	-															
6. SH	1.76	0.58	-.10*	.11**	.04	.13**	.20**	-														
7. AU	2.51	0.47	.23**	-.25**	-.27**	-.17**	-.25**	-.18**	-													
8. SS	2.83	0.62	.29**	-.16**	-.02	.01	-.10*	-.23**	.25**	-												
9. SC	3.24	0.50	.11**	-.09*	.01	.02	-.13**	-.41**	.09*	.19**	-											
10. WP	2.82	0.51	.19**	-.20**	.04	-.03	-.05	-.27**	.07	.25**	.19**	-										
11. RC	2.69	0.50	.12**	-.19**	.07	-.05	.01	-.21**	.13**	.26**	.10*	.45**	-									
12. OD	3.10	0.55	.15**	-.16**	.10*	.10*	-.04	-.19**	.20**	.27**	.17**	.14**	.20**	-								
13. SL	2.30	0.55	.22**	-.44**	-.12**	-.16**	-.02	-.17**	.20**	.22**	.10*	.34**	.30**	.24**	-							
14. EM	2.86	0.58	-.06	-.12**	.03	-.05	-.09*	-.15**	-.02	.01	.02	.24**	.19**	.07	.13**	-						
15. IC	2.22	0.51	.17**	-.28**	-.14**	-.20**	-.08	-.20**	.21**	.18**	.08	.28**	.30**	.17**	.40**	.20**	-					
16. RE	2.25	0.51	.13**	-.32**	-.13**	-.06	-.07	-.10*	.19**	.26**	.06	.16**	.18**	.35**	.42**	.05	.30**	-				
17. TR	3.24	0.73	.17**	-.09*	-.01	.04	.07	-.22**	.07	.21**	.35**	.32**	.20**	.12**	.19**	.02	.22**	.14**	-			
18. RW	2.64	0.51	.21**	-.44**	-.25**	-.16**	-.22**	-.15**	.39**	.16**	.14**	.14**	.06	.14**	.22**	.06	.07	.18**	.03	-		
19. BU	2.13	0.52	-.08	.44**	.06	.23**	.18**	.25**	-.18**	-.21**	-.20**	-.26**	-.25**	-.28**	-.33**	-.14**	-.27**	-.25**	-.15**	-.20**	-	
20. WE	5.26	1.07	.06	-.20**	.04	-.04	-.05	-.10*	.13**	.22**	.13**	.10*	.16**	.42**	.22**	.03	.19**	.27**	.14**	.11**	-.55**	-
21. JS	2.71	0.50	.17**	-.36**	-.09*	-.15**	-.13**	-.18**	.26**	.33**	.20**	.22**	.29**	.49**	.35**	.11**	.34**	.42**	.17**	.21**	-.49**	.51**

Note. PSC = group-level psychosocial safety climate. TP = time pressure. CD = cognitive demands. ED = emotional demands. PD = physical demands. SH = social harassment. AU = autonomy. SS = social support from supervisor. SC = social support from colleagues. WP = work procedures. RC = role clarity. OD = opportunities for development. SL = staffing levels. EM = equipment and materials. IC = internal communication. RE = (financial) rewards. TR = team reflexivity. RW = recovery within worktime. BU = burnout. WE = work engagement. JS = job satisfaction. N of the studied variables differentiated between 608 and 613. * $p < .05$; ** $p < .01$.

Hypotheses testing

Relative fit indices models

First, we assessed fit indices (i.e., CFI and RMSEA) of the 12 tested models to confirm models fit. We confirmed a good fit of all tested models, CFI > .95 and RMSEA < .05.

Direct relationships between job characteristics and SE indicators

Hypothesis 1a proposed that lower job demands would be associated with lower burnout and higher job satisfaction. As shown in Table 2, almost all job demands (i.e., time pressure ($\beta = .50, p < .01$), social harassment ($\beta = .15, p < .01$), physical demands ($\beta = .11, p < .01$), and emotional demands ($\beta = .09, p < .05$)) were positively associated with burnout, supporting Hypothesis 1a. Cognitive demands ($\beta = -.14, p < .05$), however, had a negative association, opposing Hypothesis 1a. Time pressure ($\beta = -.39, p < .01$) and social harassment ($\beta = -.10, p < .05$) were negatively associated with job satisfaction, while the other job demands were not significantly associated. Thus, Hypothesis 1a is partially supported. Lastly, exploratory research demonstrated that cognitive demands ($\beta = .28, p < .05$) were positively related to work engagement, whereas time pressure ($\beta = -.54, p < .01$) was negatively related.

Hypothesis 1b proposed that higher job resources would be associated with lower burnout, higher job satisfaction, and higher work engagement. In line with Hypothesis 1b, job resources were negatively related to burnout (i.e., opportunities for development ($\beta = -.14, p < .01$), staffing levels ($\beta = -.14, p < .01$), internal communication ($\beta = -.12, p < .01$), recovery within work time ($\beta = -.09, p < .05$), and social support from colleagues ($\beta = -.12, p < .01$)). Furthermore, job resources were positively associated with job satisfaction (i.e., opportunities for development ($\beta = .27, p < .01$), (financial) rewards ($\beta = .17, p < .01$), internal communication ($\beta = .14, p < .05$), social support from colleagues ($\beta = .09, p < .05$), role clarity ($\beta = .09, p < .05$), social support from supervisor ($\beta = .08, p < .05$), and staffing levels ($\beta = .06, p < .05$)) (see Table 2). Job resources were also positively associated with work engagement (i.e., opportunities for development ($\beta = .66, p < .01$), internal communication ($\beta = .17, p < .05$), social support from supervisor ($\beta = .15, p < .05$), and staffing levels ($\beta = .12, p < .05$)). The job resources autonomy, work procedures, equipment and materials, and team reflexivity were not significantly related to SE indicators. Thus, Hypothesis 1b is partially supported.

Direct relationships between PSC and job characteristics

The second hypothesis predicted that higher PSC would be associated with lower job demands (Hypothesis 2a) and higher job resources (Hypothesis 2b). PSC is only negatively associated with social harassment ($\gamma = -.23, p < .01$) and not significantly related to the other job demands (see Table 2). Thus, Hypothesis 2a is partially supported. In support of Hypothesis 2b, PSC is positively related to 7 out of 12 job resources (i.e., social support from supervisor ($\gamma = .71, p < .01$), team reflexivity ($\gamma = .49, p < .01$), staffing levels ($\gamma = .49, p < .01$), autonomy ($\gamma = .43, p < .01$), recovery within worktime ($\gamma = .42, p < .01$), work procedures ($\gamma = .40, p < .01$), and opportunities for development ($\gamma = .34, p < .05$)) (see Table 2). PSC was not significantly related to the job resources social support from colleagues, role clarity, equipment and materials, internal communication, and (financial) rewards.

Mediation models: job characteristics as mediators in the PSC - SE relationships

Hypothesis 3a proposed higher PSC would be indirectly associated with lower burnout and higher job satisfaction through its association with lower job demands. PSC and all job demands determined 26% of burnout, 18% of job satisfaction, and 6% of work engagement. We found that only social harassment mediated the relationship between PSC and burnout, $\gamma = -.04, p < .01$ (See Table 2 and Figure 2). No other job demands were significant mediators in the relationship between PSC and SE indicators, providing partial support for Hypothesis 3a. Exploratory research did not find job demands as significant mediators in the PSC-work engagement relationship.

Hypothesis 3b proposed that higher PSC would be indirectly associated with lower burnout and higher job satisfaction and higher work engagement through its association with higher job resources. PSC and all job resources determined 22% of burnout, 39% of job satisfaction, and 22% of work engagement. The results demonstrated that staffing levels mediated the relationship between PSC and burnout, $\gamma = -.07, p < .05$. Opportunities for development mediated the relationship between PSC and job satisfaction ($\gamma = .09, p < .05$), and PSC and work engagement ($\gamma = .22, p < .05$). Moreover, social support from supervisor mediated the relationship between PSC and job satisfaction ($\gamma = .06, p < .05$) (See Table 2 and Figure 2). All mediating relationships found were perceived as indirect-only mediation (Zhao et al., 2010). Furthermore, there were no other significant mediation effects. Thus, Hypothesis 3b is partially supported.

Table 2. Direct and Indirect Relationships Between PSC (X), Job Demands and Resources (M), and Outcomes (Y)

Model	Predictor (X)	Mediator (M)	Outcome (Y)	X → M (β)	M → Y (β)	X → M → Y (β)
Model 1	PSC (group-level)	Job demands	Burnout			
		Time pressure		-.13 (.08)	.50 (.07)**	-.07 (.04)
		Cognitive demands		-.13 (.13)	-.14 (.06)*	.02 (.02)
		Emotional demands		-.16 (.14)	.09 (.04)*	-.02 (.01)
		Physical demands		-.32 (.17)	.11 (.03)**	-.03 (.02)
		Social harassment		-.23 (.08)**	.15 (.04)**	-.04 (.01)**
Model 2	PSC (group-level)	Job demands	Job satisfaction			
		Time pressure		-.13 (.08)	-.39 (.07)**	.05 (.04)
		Cognitive demands		-.13 (.13)	.05 (.06)	-.01 (.01)
		Emotional demands		-.16 (.14)	-.01 (.05)	.002 (.01)
		Physical demands		-.31 (.17)	-.08 (.06)	.02 (.02)
		Social harassment		-.23 (.08)**	-.10 (.05)*	.02 (.01)
Model 3	PSC (group-level)	Job demands	Work engagement			
		Time pressure		-.14 (.09)	-.54 (.10)**	.07 (.05)
		Cognitive demands		-.13 (.13)	.28 (.13)*	-.04 (.04)
		Emotional demands		-.17 (.14)	.02 (.11)	-.004 (.02)
		Physical demands		-.32 (.17)	-.08 (.14)	.03 (.05)
		Social harassment		-.23 (.08)**	-.13 (.11)	.03 (.03)
Model 4	PSC (group-level)	Job resources	Burnout			
		Autonomy		.44 (.10)**	-.05 (.04)	-.02 (.02)
		Social support supervisor		.71 (.14)**	-.04 (.04)	-.03 (.03)
		Social support colleagues		.21 (.12)	-.12 (.04)**	-.02 (.01)
		Work procedures		.40 (.15)**	-.07 (.06)	-.03 (.02)
		Role clarity		.25 (.14)	-.07 (.04)	-.02 (.02)
		Opportunities for development		.34 (.14)*	-.14 (.04)**	-.05 (.03)
		Staffing levels		.49 (.18)**	-.14 (.04)**	-.07 (.03)*
		Equipment and materials		-.14 (.20)	-.04 (.03)	.01 (.01)
		Internal communication		.34 (.18)	-.12 (.04)**	-.04 (.02)
		(financial) Rewards		.27 (.18)	-.04 (.04)	-.01 (.01)
		Team reflexivity		.49 (.17)**	.002 (.04)	.001 (.02)
		Recovery within worktime		.42 (.11)**	-.09 (.05)*	-.04 (.02)

Model	Predictor (X)	Mediator (M)	Outcome (Y)	X → M (β)	M → Y (β)	X → M → Y (β)
Model 5	PSC (group-level)	Job resources	Job satisfaction			
		Autonomy		.43 (.10)**	.07 (.05)	.03 (.02)
		Social support supervisor		.71 (.14)**	.08 (.04)*	.06 (.03)*
		Social support colleagues		.21 (.12)	.09 (.04)*	.02 (.01)
		Work procedures		.40 (.15)**	-.01 (.04)	-.003 (.02)
		Role clarity		.25 (.14)	.09 (.04)*	.02 (.02)
		Opportunities for development		.34 (.14)*	.27 (.03)**	.09 (.04)*
		Staffing levels		.49 (.18)**	.06 (.03)*	.03 (.02)
		Equipment and materials		-.14 (.20)	.02 (.03)	-.002 (.01)
		Internal communication		.34 (.18)	.14 (.06)*	.05 (.03)
		(financial) Rewards		.26 (.18)	.17 (.04)**	.05 (.03)
		Team reflexivity		.49 (.17)**	-.001 (.02)	-.001 (.01)
		Recovery within worktime		.42 (.11)**	.05 (.03)	.02 (.02)
Model 6	PSC (group-level)	Job resources	Work engagement			
		Autonomy		.43 (.10)**	-.004 (.11)	-.002 (.05)
		Social support supervisor		.72 (.14)**	.15 (.07)*	.11 (.06)
		Social support colleagues		.22 (.12)	.07 (.09)	.02 (.02)
		Work procedures		.40 (.15)**	-.09 (.10)	-.03 (.05)
		Role clarity		.24 (.14)	.05 (.08)	.01 (.02)
		Opportunities for development		.34 (.14)*	.66 (.08)**	.22 (.10)*
		Staffing levels		.50 (.18)**	.12 (.06)*	.06 (.04)
		Equipment and materials		-.14 (.20)	-.05 (.05)	.01 (.01)
		Internal communication		.35 (.19)	.17 (.08)*	.06 (.04)
		(financial) Rewards		.27 (.19)	.16 (.12)	.04 (.03)
		Team reflexivity		.50 (.17)**	.07 (.07)	.04 (.04)
		Recovery within worktime		.42 (.11)**	.07 (.09)	.03 (.04)

Note. Parameter estimates with standard errors in brackets. X is at the group level. M and Y are at the individual level. * $p < .05$; ** $p < .01$.

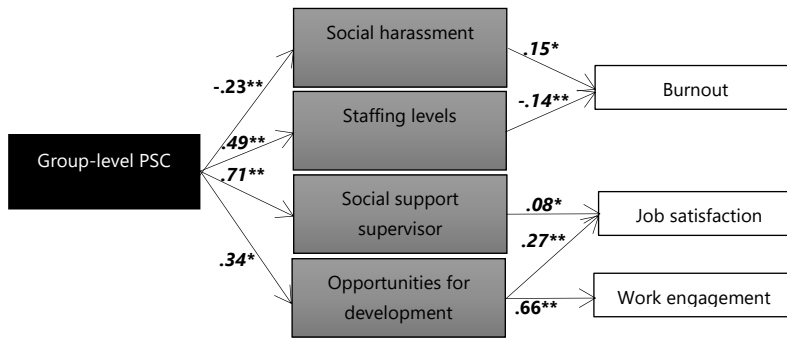


Figure 2. Mediation model including only the significant indirect relationships between PSC and SE indicators through job characteristics. **Note.** PSC: psychosocial safety climate.

Moderation models: PSC as moderator in job characteristics - SE relationships

Hypothesis 4a proposed that PSC would buffer the relationships between job demands and burnout and job satisfaction. We found a significant interaction effect between PSC and social harassment in relation to burnout, $\gamma = .37, p < .01$. In contrast to Hypothesis 4a, PSC did not buffer the relationship between social harassment and burnout, but strengthened this relationship (see Figure 3a). No other significant moderation effects were found. Exploratory research did not find job demands as significant moderators in the PSC-work engagement relationship.

Hypothesis 4b proposed that PSC would boost the relationships between job resources and SE indicators. In contrast to Hypothesis 4b, PSC did not boost job resources - SE indicators relationships. However, we found a significant interaction effect between PSC and work procedures for burnout ($\gamma = -.53, p < .05$) and between PSC and internal communication for job satisfaction ($\gamma = .56, p < .01$). Figure 3 presents that for high PSC, there was a stronger relationship between work procedures and burnout (3b) and between internal communication and job satisfaction (3c), compared to low PSC, where these job resources exhibited either no or a limited relationship with burnout and job satisfaction. Specifically, high PSC combined with low job resources (i.e., work procedures and internal communication) was related to more unfavourable SE outcomes (higher burnout and lower job satisfaction). Conversely, high PSC combined with high job resources was related to more favourable SE outcomes (lower burnout and higher job satisfaction). No other significant moderation effects between PSC and job resources in relation to SE indicators were found, in contrast to Hypothesis 4b.

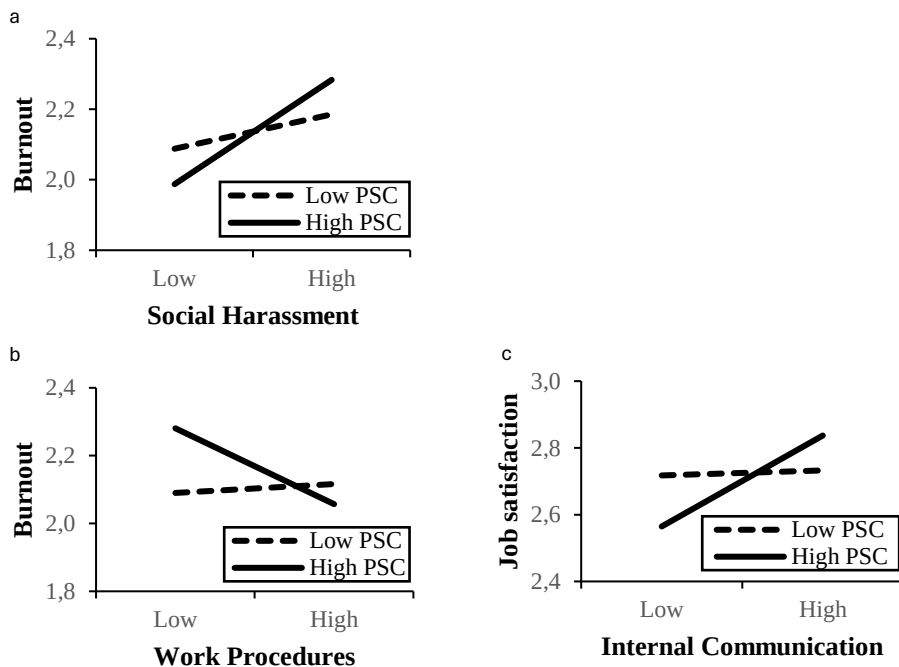


Figure 3. The significant interactions between Psychosocial Safety Climate (PSC) and (a) Social Harassment, (b) Work Procedures, and (c) Internal Communication for Burnout (a + b) and Job Satisfaction (c). **Note.** Low PSC = -1SD. High PSC = +1SD

Discussion

This study aimed to explore the role of job characteristics (i.e., job demands and job resources) in explaining SE (i.e., burnout, work engagement, and job satisfaction). Furthermore, it explored PSC as 'cause of causes', by examining its direct relationships with job characteristics and its indirect relationships with SE through job characteristics. It also examined PSC as a 'buffer or booster', by examining its moderating role in job characteristics-SE relationships. Previous research on among medical doctors has scarcely examined the relationships between job characteristics and positive SE indicators, nor has it considered PSC as an organisational resource in relation to SE. Studies that did explore PSC focused on other occupational groups, considered a limited selection of job characteristics, and did not include job satisfaction as an outcome. This study extends the existing literature by applying the JD-R model, incorporating PSC, in a large sample of Dutch medical doctors across various organisational settings. It included a comprehensive set of job characteristics, and examined both negative and positive SE indicators. The findings provide valuable insights into the drivers of SE, offering knowledge to develop interventions aimed at maintaining and enhancing medical doctors' SE.

Our results demonstrated that almost all job demands (i.e., time pressure, emotional and physical demands, and social harassment) were associated with higher burnout, and some (i.e., time pressure and social harassment) were associated with lower job satisfaction. Time pressure emerged as the most important predictor due to its strongest relationship with both burnout and job satisfaction. As job demands require physiological and/or psychological effort and cause stress (Schaufeli & Bakker, 2004), they increase burnout (Schaufeli, 2017) and decrease job satisfaction (Fila et al., 2017). Surprisingly, higher cognitive demands were related to lower burnout. This supports the research of Livne and Rashkovits (2018), which drawing on the Activation Theory and JD-R model, suggests that cognitively challenging jobs utilise cognitive resources that foster growth, learning, and pleasure. These jobs require a variety of skills, which enhances intrinsic motivation and psychological empowerment, thereby mitigating burnout. Additionally, our exploratory analysis found that cognitive demands were positively related to work engagement, while time pressure was negatively related. Previous studies (e.g., Van Den Broeck et al., 2010) posited that job hindrances, in our study time pressure, deplete energy, negatively affect work engagement and increase burnout. Conversely, job challenges are both motivating and energy-depleting. Interestingly, cognitive demands were positively related to work engagement and negatively related to burnout, indicating that for medical doctors, cognitive demands might be entirely challenging, enhancing both motivation and energy.

Furthermore, 8 out of 12 job resources were associated with at least one SE indicator, aligning with numerous empirical findings that job resources predict health and well-being outcomes (Schaufeli, 2017). Opportunities for development, staffing levels, and internal communication were related to all three SE indicators, with opportunities for development emerging as the most important predictor due to its strongest relationships with all SE indicators. The positive relationships between job resources and work engagement and job satisfaction support the JD-R model's motivational process (Schaufeli & Bakker, 2004b). Opportunities for development and internal communication were among the top three most important predictors of both work engagement and job satisfaction, while (financial) rewards was specifically important for job satisfaction and social support from supervisor for work engagement. The negative relationships between job resources and burnout align with the JD-R model's health impairment process (Schaufeli, 2017). Adequate job resources enable medical doctors to work more effectively, manage their job demands, and meet their job requirements, thereby reducing the risk of prolonged stress and burnout. Together these relationships indicate that job resources can enhance motivation and energy of medical doctors.

In relation to the JD-R model extended with PSC, we found that higher PSC was related to lower social harassment, consistent with Law et al. (2011). According to the work environment hypothesis, social harassment is a product of the work environment's design (Nielsen & Einarsen, 2018). In high PSC environments, management aims to protect employees' psychological health by implementing policies, practices and procedures that prevent social harassment (Law et al., 2011; Nielsen & Einarsen, 2018). Thus, organisations signal that social harassment will not be tolerated. PSC was unexpectedly unrelated to other job demands. This may be due to organisations have less influence on emotional (e.g., dealing with the sickness of patients), cognitive (e.g., high work intensity) or physical (e.g., need to stand for the job) demands, compared to managing social harassment. These demands are more strongly determined by the nature of the medical doctor job (Rothenberger, 2017; West et al., 2018). Time pressure (e.g., sufficient time for patients) is perhaps more affected by interorganisational factors like staff shortages or higher production figures. Additionally, PSC was positively related to 7 out of 12 job resources (i.e., autonomy, social support from supervisor, work procedures, opportunities for development, staffing levels, team reflexivity, and recovery within worktime). This supports the idea that high PSC organisations prioritise employees' psychological health and safety by providing adequate job resources (Dollard et al., 2012; Yulita et al., 2017). Interestingly, PSC was more strongly related to higher job resources than to lower job demands. This may be because job demands are perhaps harder to influence due to their inherent nature of medical doctors' profession or interorganisational factors, unlike job resources, which are perhaps more often under organisational control.

Our results provide some support for the notion of PSC as 'cause of causes' in determining SE via job characteristics (Dollard et al., 2012; Dollard & Bakker, 2010). Despite a quite low overall PSC-level ($M = 2.94$, $SD = 0.23$), and the small variance in PSC, which makes detecting mediation effects more challenging, job demand social harassment was still found to explain the indirect relationship between PSC and burnout. The other job demands did not act as mediators. In line with previous arguments, social harassment might be indirectly related to burnout, unlike other job demands, because it is more influenced by organisational procedures, practices, and policies. Additionally, three job resources - staffing levels, opportunities for development, and social support from supervisors - explained the indirect relationships between PSC and SE indicators. PSC was related to other job resources - autonomy, work procedures, team reflexivity, and recovery within worktime - but not indirectly related to SE through these resources. These resources might be more related to task-level and interpersonal-level factors (Schaufeli & Bakker, 2004b), impacting medical doctors' work efficiency (e.g., work

procedures) or teamwork (e.g., team reflexivity) (West et al., 2018). In contrast, the mediating resources might pertain more to organisational-level factors (Schaufeli & Bakker, 2004) or organisational climate factors (West et al., 2018), such as leadership behaviours and prospects for personal growth. Therefore, the protection of medical doctors' SE via organisational-level (climate)-related resources might be more strongly related to PSC, whereas task-level and interpersonal resources might also be related to for instance the medical doctors themselves, the interaction between medical doctors or the nature of their work.

Lastly, despite the limited variability in PSC, our study provided some support for that PSC moderates the relationships between job characteristics and SE indicators. We found that PSC had a moderating role in both the health impairment and motivational process. However, we found unexpected results. In fact, under low PSC, job demand social harassment and job resources work procedures and internal communication had a limited association with burnout or job satisfaction. Conversely, under high PSC, an unfavourable work environment (high social harassment or poor work procedures or internal communication) was associated with higher burnout and lower job satisfaction. There may have been a mismatch between stated PSC intentions and actual practices (enacted PSC) (Yulita et al., 2017). In high PSC, there may have been more focus on SE concerns, but without corresponding to this in practice, resulting in a still unfavourable work environment, contributing to higher burnout and lower job satisfaction compared to low PSC. Furthermore, this may be due to the generally low PSC levels in our study, with most medical doctor groups scoring below the favourable PSC threshold (Bailey et al., 2015).

Strengths

This study has several strengths. First, to our best knowledge, research has not yet examined the extended JD-R model among medical doctors. This is the first study that provides insights into PSC as 'cause of causes' and 'buffer or booster' in determining medical doctors' SE, based on a large sample of 613 medical doctors across 28 groups in various organisational settings. Secondly, PSC is assessed through subjective evaluation. Medical doctors' perceptions about PSC might be more important for their perceived job characteristics, than for instance, top management and direct supervisors' perceptions about PSC. Third, we measured a comprehensive set of job demands and job resources relevant to medical doctors to examine their role in the PSC-SE relationships. In line with Schaufeli and Bakker (2004), we measured job resources at the task-level (e.g., autonomy), interpersonal-level (e.g., team reflexivity), and organisational-level (e.g., (financial) rewards). Lastly, this study comprehensively examined SE as an integrated construct

consisting of a negative SE indicator and positive SE indicators, which extends earlier work on SE among medical doctors that primarily examined burnout.

Limitations and suggestions for future research

This study also has some limitations. First, the groups of medical doctors were self-selected to participate in an organisational-level intervention. Hence, this may limit the generalisability to medical doctors in general. Furthermore, the participating groups of medical doctors may differ in their scores on PSC, job characteristics or SE compared to medical doctor groups in general. However, this study is focused on relationships between PSC, job characteristics and SE, and with sufficient variation to examine these relationships, with the exception of PSC. In line with recommendations of previous research (Dollard et al., 2012; Dollard & Bakker, 2010), we aggregated PSC scores, thus measuring PSC at the group-level. The variance in group-level PSC was rather small and the groups generally had an unfavourable PSC, making it more difficult to find mediation and moderation effects. Future research could replicate this study, including more randomly recruited groups of medical doctors. Lastly, two limitations affect the conclusions that we can draw based on our findings. Our study is based on cross-sectional data, that only justify drawing conclusions about associations and not causality. Although in general the constructs assessed yielded good internal reliability in our sample, for a few constructs (i.e., recovery within worktime, autonomy, and physical demands) this was suboptimal, potentially as a consequence of the specific sample under study. For future research, we recommend a longitudinal study design to grasp causality of the examined relationships, and intervention research to determine whether improvements in PSC lead to enhanced SE through improvements in job characteristics.

Implications and conclusion

This study's findings suggest that extending the Job Demands-Resources model with PSC is valuable, as supported by the observed relationships between PSC, job demands and resources, and medical doctors' SE indicators. Accordingly, it is important to implement interventions targeting PSC alongside job demands and resources within healthcare organisations to enhance medical doctors' SE. High PSC organisations prioritise addressing psychosocial workload and promoting employees' mental health and well-being, alongside other objectives such as productivity and quality of care. This prioritisation fosters a broad organisational climate, at different layers within an organisation, and an operational approach encompassing policies, work practices, and communication strategies. Such a climate and operational approach focuses on maintaining a realistic and achievable workload and providing adequate job resources to protect medical

doctors' mental health and well-being. Healthcare organisations can achieve this by designing favourable work environments, that include for instance manageable time pressure, prevention of social harassment, encouraging cognitive demands, and adequate job resources, such as opportunities for development, adequate staffing levels, and good internal communication. Such favourable work environments help sustain medical doctors' energy and motivation, enabling them to participate in their work sustainably. This is especially crucial for retaining employed medical doctors amidst the current healthcare staff shortages and preventing the exacerbation of this problem. It is therefore important for healthcare organisations to recognise that, while some systemic factors in healthcare may be beyond their control, within their organisation they can actively contribute to safeguarding medical doctors' SE by creating a more favourable PSC. By prioritising the protection of medical doctors' SE, organisations can translate these priorities into policies, practices, and procedures that create manageable job demands and strong job resources. For instance, they can consider psychosocial workload in relation to medical doctors' mental health and well-being by setting realistic targets, streamlining processes, fostering open communication, and recognising and valuing their medical doctors. Organisations can prevent or address social harassment through an anti-harassment policy or safe workplace initiatives, including preventive measures and clear procedures for rapid response when incidents occur. Such efforts can reduce burnout while enhancing job satisfaction and work engagement. In this regard, it is essential that stated PSC intentions and enacted PSC practices are aligned. Improving PSC in organisations is not only beneficial for medical doctors but can also be applied more broadly across other medical professions (e.g., Dollard et al., 2012) or non-medical professions (Dollard & Bakker, 2010). As stated by Dollard et al. (2012), all organisations would benefit from creating a high PSC, as it is a prerequisite for sustainable work practices and sustained employability of their workforce.

References

- Bailey, T. S., Dollard, M. F., & Richards, P. A. M. (2015). A national standard for psychosocial safety climate (PSC): PSC 41 as the benchmark for low risk of job strain and depressive symptoms. *Journal of Occupational Health Psychology, 20*(1), 15–26. <https://doi.org/10.1037/a0038166>
- Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology, 22*(3), 273–285. <https://doi.org/10.1037/ocp0000056>
- Boniol, M., Kunjumen, T., Nair, T. S., Siyam, A., Campbell, J., & Diallo, K. (2022). The global health workforce stock and distribution in 2020 and 2030: A threat to equity and ‘universal’ health coverage? *BMJ Global Health, 7*(6), e009316. <https://doi.org/10.1136/bmjgh-2022-009316>
- Bronkhorst, B. (2015). Behaving safely under pressure: The effects of job demands, resources, and safety climate on employee physical and psychosocial safety behavior. *Journal of Safety Research, 55*, 63–72. <https://doi.org/10.1016/j.jsr.2015.09.002>
- Bronkhorst, B., & Vermeeren, B. (2016). Safety climate, worker health and organizational health performance: Testing a physical, psychosocial and combined pathway. *International Journal of Workplace Health Management, 9*(3), 270–289. <https://doi.org/10.1108/IJWHM-12-2015-0081>
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research, 21*(2), 230–258. <https://doi.org/10.1177/0049124192021002005>
- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*(5), 834–848. <https://doi.org/10.1037/a0019364>
- De Jonge, J., Dormann, C., Van Vegchel, N., Nordheim, V., Dollard, T., Cotton, M., et al. (2009). DISQ-S 2.1: De Verkorte DISC Vragenlijst Nederlandse Versie 2.1 [DISQ-S 2.1: The DISC Questionnaire Dutch Version 2.0]. Eindhoven: Technische Universiteit Eindhoven.
- Dollard, M. F., & Bakker, A. B. (2010). Psychosocial safety climate as a precursor to conducive work environments, psychological health problems, and employee engagement. *Journal of Occupational and Organizational Psychology, 83*(3), 579–599. <https://doi.org/10.1348/096317909X470690>
- Dollard, M. F., Opie, T., Lenthall, S., Wakerman, J., Knight, S., Dunn, S., Rickard, G., & MacLeod, M. (2012). Psychosocial safety climate as an antecedent of work characteristics and psychological strain: A multilevel model. *Work and Stress, 26*(4), 385–404. <https://doi.org/10.1080/02678373.2012.734154>
- Domagała, A., Bała, M. M., Storman, D., Peña-Sánchez, J. N., Świercz, M. J., Kaczmarczyk, M., & Storman, M. (2018). Factors associated with satisfaction of hospital physicians: A systematic review on European data. *International Journal of Environmental Research and Public Health, 15*(11), 2546. <https://doi.org/10.3390/ijerph15112546>
- Fila, M. J., Purl, J., & Griffeth, R. W. (2017). Job demands, control and support: Meta-analyzing moderator effects of gender, nationality, and occupation. *Human Resource Management Review, 27*(1), 39–60. <https://doi.org/10.1016/j.hrmr.2016.09.004>

- Fleuren, B. P. I., de Grip, A., Jansen, N. W. H., Kant, Ij., & Zijlstra, F. R. H. (2020). Unshrouding the sphere from the clouds: Towards a comprehensive conceptual framework for sustainable employability. *Sustainability*, 12(16), 6366. <https://doi.org/10.3390/su-12166366>
- Gelsema, T. I., van der Doef, M., Maes, S., Akerboom, S., & Verhoeven, C. (2005). Job stress in the nursing profession: The influence of organizational and environmental conditions and job characteristics. *International Journal of Stress Management*, 12(3), 222–240. <https://doi.org/10.1037/1072-5245.12.3.222>
- Hall, G. B., Dollard, M. F., & Coward, J. (2010). Psychosocial safety climate: Development of the PSC-12. *International Journal of Stress Management*, 17(4), 353–383. <https://doi.org/10.1037/a0021320>
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44(3), 513–524. <https://doi.org/10.1037/0003-066X.44.3.513>
- Hoff, T., Young, G., Xiang, E., & Raver, E. (2015). Understanding U.S. physician satisfaction: State of the evidence and future directions. *Journal of Healthcare Management*, 60(6), 409–427.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Idris, M. A., & Dollard, M. F. (2011). Psychosocial safety climate, work conditions, and emotions in the workplace: A Malaysian population-based work stress study. *International Journal of Stress Management*, 18(4), 324–347. <https://doi.org/10.1037/a0024849>
- Idris, M. A., Dollard, M. F., & Tuckey, M. R. (2015). Psychosocial safety climate as a management tool for employee engagement and performance: A multilevel analysis. *International Journal of Stress Management*, 22(2), 183–206. <https://doi.org/10.1037/a0038986>
- Law, R., Dollard, M. F., Tuckey, M. R., & Dormann, C. (2011). Psychosocial safety climate as a lead indicator of workplace bullying and harassment, job resources, psychological health and employee engagement. *Accident Analysis & Prevention*, 43(5), 1782–1793. <https://doi.org/10.1016/j.aap.2011.04.010>
- Lesener, T., Gusy, B., & Wolter, C. (2019). The job demands-resources model: A meta-analytic review of longitudinal studies. *Work & Stress*, 33(1), 76–103. <https://doi.org/10.1080/02678373.2018.1529065>
- Livne, Y., & Rashkovits, S. (2018). Psychological empowerment and burnout: Different patterns of relationship with three types of job demands. *International Journal of Stress Management*, 25(1), 96–108. <https://doi.org/10.1037/str0000050>
- Loh, M. Y., Idris, M. A., Dollard, M. F., & Isahak, M. (2018). Psychosocial safety climate as a moderator of the moderators: Contextualizing JDR models and emotional demands effects. *Journal of Occupational and Organizational Psychology*, 91(3), 620–644. <https://doi.org/10.1111/joop.12211>
- Mache, S., Vitzthum, K., Wanke, E., Groneberg, D. A., Klapp, B. F., & Danzer, G. (2014). Exploring the impact of resilience, self-efficacy, optimism and organizational resources on work engagement. *Work*, 47(4), 491–500. <https://doi.org/10.3233/WOR-131617>
- Maes, S., Akerboom, S., Van der Doef, M., & Verhoeven, C. (1999). The Leiden quality of work life questionnaire for nurses (LQWLQ-N). Health Psychology, Leiden University, Leiden, The Netherlands.

- Nielsen, M. B., & Einarsen, S. V. (2018). What we know, what we do not know, and what we should and could have known about workplace bullying: An overview of the literature and agenda for future research. *Aggression and Violent Behavior, 42*, 71–83. <https://doi.org/10.1016/j.avb.2018.06.007>
- Nunnally, J. C. (1978). An overview of psychological measurement. In Wolman, B.B. (eds), *Clinical Diagnosis of Mental Disorders: A Handbook* (pp. 97–146). Springer, Boston, MA. https://doi.org/10.1007/978-1-4684-2490-4_4
- Patel, R. S., Bachu, R., Adikey, A., Malik, M., & Shah, M. (2018). Factors related to physician burnout and its consequences: A review. *Behavioral Sciences, 8*(11), 98. <https://doi.org/10.3390/bs8110098>
- Rao, S., Ferris, T. G., Hidrue, M. K., Lehrhoff, S. R., Lenz, S., Heffernan, J., McKee, K. E., & del Carmen, M. G. (2020). Physician burnout, engagement and career satisfaction in a large academic medical practice. *Clinical Medicine & Research, 18*(1), 3–10. <https://doi.org/10.3121/cmr.2019.1516>
- Rothenberg, D. A. (2017). Physician burnout and well-being: A systematic review and framework for action. *Diseases of the Colon & Rectum, 60*(6), 567–576. <https://doi.org/10.1097/DCR.0000000000000844>
- Schaufeli, W. B. (2017). Applying the job demands-resources model: A ‘how to’ guide to measuring and tackling work engagement and burnout. *Organizational Dynamics, 46*(2), 120–132. <https://doi.org/10.1016/j.orgdyn.2017.04.008>
- Schaufeli, W. B., & Bakker, A. B. (2004a). Bevoegheid: Een begrip gemeten. *Gedrag & Organisatie, 17*(2). <https://doi.org/10.5117/2004.017.002.002>
- Schaufeli, W. B., & Bakker, A. B. (2004b). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior, 25*(3), 293–315. <https://doi.org/10.1002/job.248>
- Schaufeli, W. B., Desart, S., & De Witte, H. (2020). Burnout assessment tool (BAT)—development, validity, and reliability. *International Journal of Environmental Research and Public Health, 17*(24), 9495. <https://doi.org/10.3390/ijerph17249495>
- Schippers, M. C., Den Hartog, D. N., & Koopman, P. L. (2005). Reflexiviteit van teams: Ontwikkeling van een instrument. *Gedrag & Organisatie, 18*(2). <https://doi.org/10.5117/2005.018.002.002>
- Shanafelt, T. D., Hasan, O., Dyrbye, L. N., Sinsky, C., Satele, D., Sloan, J., & West, C. P. (2015). Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clinic Proceedings, 90*(12), 1600–1613. <https://doi.org/10.1016/j.mayocp.2015.08.023>
- Shanafelt, T. D., & Noseworthy, J. H. (2017). Executive leadership and physician well-being. *Mayo Clinic Proceedings, 92*(1), 129–146. <https://doi.org/10.1016/j.mayocp.2016.10.004>
- Swensen, S., Kabacell, A., & Shanafelt, T. (2016). Physician-organization collaboration reduces physician burnout and promotes engagement: The mayo clinic experience. *Journal of Healthcare Management, 61*(2), 105.
- Van Den Broeck, A., De Cuyper, N., De Witte, H., & Vansteenkiste, M. (2010). Not all job demands are equal: Differentiating job hindrances and job challenges in the job demands–resources model. *European Journal of Work and Organizational Psychology, 19*(6), 735–759. <https://doi.org/10.1080/13594320903223839>

- Van der Doef, M., & Maes, S. (1999). The Leiden quality of work questionnaire: Its construction, factor structure, and psychometric qualities. *Psychological Reports*, 85(3), 954–962. <https://doi.org/10.2466/pr0.1999.85.3.954>
- Veldhoven, M., Prins, J., van der Laken, P., & Dijkstra, L. (2015). QEEW2.0: 42 short scales for survey research on work, well-being and performance. SKB.
- Weiss, H. M. (2002). Deconstructing job satisfaction: Separating evaluations, beliefs and affective experiences. *Human Resource Management Review*, 12(2), 173–194. [https://doi.org/10.1016/S1053-4822\(02\)00045-1](https://doi.org/10.1016/S1053-4822(02)00045-1)
- West, C. P., Dyrbye, L. N., & Shanafelt, T. D. (2018). Physician burnout: Contributors, consequences and solutions. *Journal of Internal Medicine*, 283(6), 516–529. <https://doi.org/10.1111/joim.12752>
- World Health Organization (WHO) (2022, October 1). Ageing and health. WHO. <https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
- Yulita, Y., Dollard, M. F., & Idris, M. A. (2017). Climate congruence: How espoused psychosocial safety climate and enacted managerial support affect emotional exhaustion and work engagement. *Safety Science*, 96, 132–142. <https://doi.org/10.1016/j.ssci.2017.03.023>
- Zhao, X., Lynch, J., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37, 197–206. <https://doi.org/10.1086/651257>

