

# BMJ Open Structural equation modelling analysis on relationships of job demands and resources with work engagement, burnout and work ability: an observational study among physicians in Dutch hospitals

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## ABSTRACT

**Objective** To investigate to what extent work engagement mediates the relationships of job resources with work ability, and to what extent burnout mediates the relationships of job demands and resources with work ability.

**Design** Multicentre observational study.

**Setting** Academic and non-academic hospitals in the Netherlands.

**Participants** Physicians (n=385) participated in this study.

**Primary and secondary outcome measures** We measured work ability with selected items from the validated Questionnaire of Experience and Evaluation of Work 2.0 (QEEW V.2.0), work engagement with the Utrecht Work Engagement Scale and burnout with the exhaustion subscale of the Oldenburg Burnout Inventory. The job demand 'workload' and job resources 'development opportunities', 'participation in decision-making', 'inspirational leadership' and 'relationships with colleagues' were measured using the QEEW V.2.0. The job demand 'bureaucratic burden' was measured with the Three Item Red Tape scale. A structural equation model was built to answer our research question.

**Results** Work engagement mediated relationships of job resources with physicians' work ability, and burnout mediated relationships of job resources and demands with work ability. Development opportunities ( $\beta=0.39$ ,  $SE=0.12$ ,  $p<0.001$ ), participation in decision-making ( $\beta=0.18$ ,  $SE=0.08$ ,  $p=0.028$ ) and relationships with colleagues ( $\beta=0.19$ ,  $SE=0.19$ ,  $p=0.002$ ) were positively related to work engagement. Development opportunities ( $\beta=-0.20$ ,  $SE=0.08$ ,  $p=0.004$ ) were negatively related and workload ( $\beta=0.51$ ,  $SE=0.19$ ,  $p<0.001$ ) was positively related to burnout. Work engagement ( $\beta=0.22$ ,  $SE=0.04$ ,  $p<0.001$ ) was positively related and burnout ( $\beta=-0.56$ ,  $SE=0.06$ ,  $p<0.001$ ) was negatively related to work ability.

**Conclusions** Physicians' work engagement and burnout mediated the relationships of various job demands and resources with their work ability. More work-engaged and less burned-out physicians reported better work ability. Hospitals may attenuate excessive workloads and facilitate

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study provides more specific insight into relationships of job demands and resources with physicians' work engagement, burnout and work ability.
- ⇒ This study used validated measurements that were chosen based on theory and a needs assessment.
- ⇒ This study included a varied sample of physicians from multiple academic and non-academic hospitals in the Netherlands, contributing to the generalisability of our results.
- ⇒ Participation was voluntary, which might have resulted in a selection bias. However, this does not necessarily influence the strength of the observed relationships, which were in line with the literature.
- ⇒ Due to the cross-sectional study design, no causal inferences can be made.

development opportunities, participation in decision-making and good collegial relationships to enhance physicians' occupational well-being and performance.

## INTRODUCTION

In contemporary medical practice, many physicians report a lack of work engagement and experience high levels of burnout.<sup>1 2</sup> Work engagement is a positive, fulfilling, work-related state of mind characterised by vigour, dedication and absorption, whereas burnout is defined as a work-related syndrome characterised by exhaustion, cynicism and inefficacy.<sup>3</sup> Work engagement and burnout are different aspects of physicians' occupational well-being that are negatively related and lead to contrasting outcomes.<sup>4 5</sup> Physicians' work engagement benefits physician retention and the cost-efficiency and quality of patient care.<sup>6-9</sup> Work-engaged physicians communicate better with patients

and colleagues, report fewer medical errors and show higher levels of work ability.<sup>7 9 10</sup> Physicians with high burnout levels, however, are more likely to make medical errors, leave the profession and their patients report less satisfaction.<sup>11 12</sup> Therefore, reducing physicians' burnout and enhancing engagement is a top priority for medical professional associations and hospitals.<sup>6 11 13 14</sup>

Hospitals can reduce burnout rates and promote work engagement by optimising working conditions in the organisation.<sup>11 15–17</sup> These working conditions are, based on the evidence-based job demands and resources (JD-R) model, categorised into JD-R.<sup>4 18</sup> Job demands are job aspects that require physical, cognitive or emotional efforts, such as excessive workloads.<sup>4 18</sup> Job resources, such as development opportunities, assist in coping with job demands, are functional in achieving work goals, and stimulate personal growth.<sup>4 18</sup>

The main premise of the JD-R model is that excessive job demands trigger stress reactions—the health impairment process—whereas having abundant job resources leads to higher motivation and productivity—the motivational process.<sup>4 18</sup> Hence, excessive job demands lead to burnout and abundant job resources to work engagement. According to the JD-R model, work engagement mediates relationships of job resources with performance outcomes, and burnout does so for job demands. Furthermore, job resources can also directly reduce burnout and thereby mitigate the negative consequences of burnout for performance.<sup>19</sup> In addition, the JD-R model considers that job resources can attenuate the negative consequences of job demands on burnout and job demands can reduce the positive effect of job resources on work engagement.<sup>4 18</sup> For example, Bakker *et al* found that social support from colleagues attenuated the ramifications of excessive workload on burnout (exhaustion).<sup>20</sup> However, the evidence for these interaction effects is inconsistent,<sup>21</sup> while research has systematically provided evidence for the health impairment and motivational process in the JD-R model.<sup>18 19</sup>

As JD-R are specific to their context and setting, a needs assessment among physicians in the current setting under study—Dutch hospitals—informing the selection of JD-R to be investigated.<sup>22</sup> The importance of the selected job demands (ie, bureaucratic burden and workload) and resources (ie, development opportunities, participation in decision-making, inspirational leadership and relationships with colleagues) for physicians' well-being has been previously demonstrated in the medical setting.<sup>10 11 17 23–25</sup> Despite this, more knowledge of physicians' perceptions of bureaucracy and inspirational leadership is needed. Although researchers report that bureaucracy is a leading cause of physician burnout,<sup>26 27</sup> we are unaware of studies that have investigated physicians' perceptions of bureaucracy in relation to their well-being and performance using the JD-R model. Furthermore, leadership is also important in the medical setting: Shanafelt *et al* found that physicians who attribute good leadership qualities to their supervisor report less burnout.<sup>28</sup> However, a

meta-analysis could not confirm the positive relationship between engaging leadership and work engagement due to limited studies.<sup>29</sup>

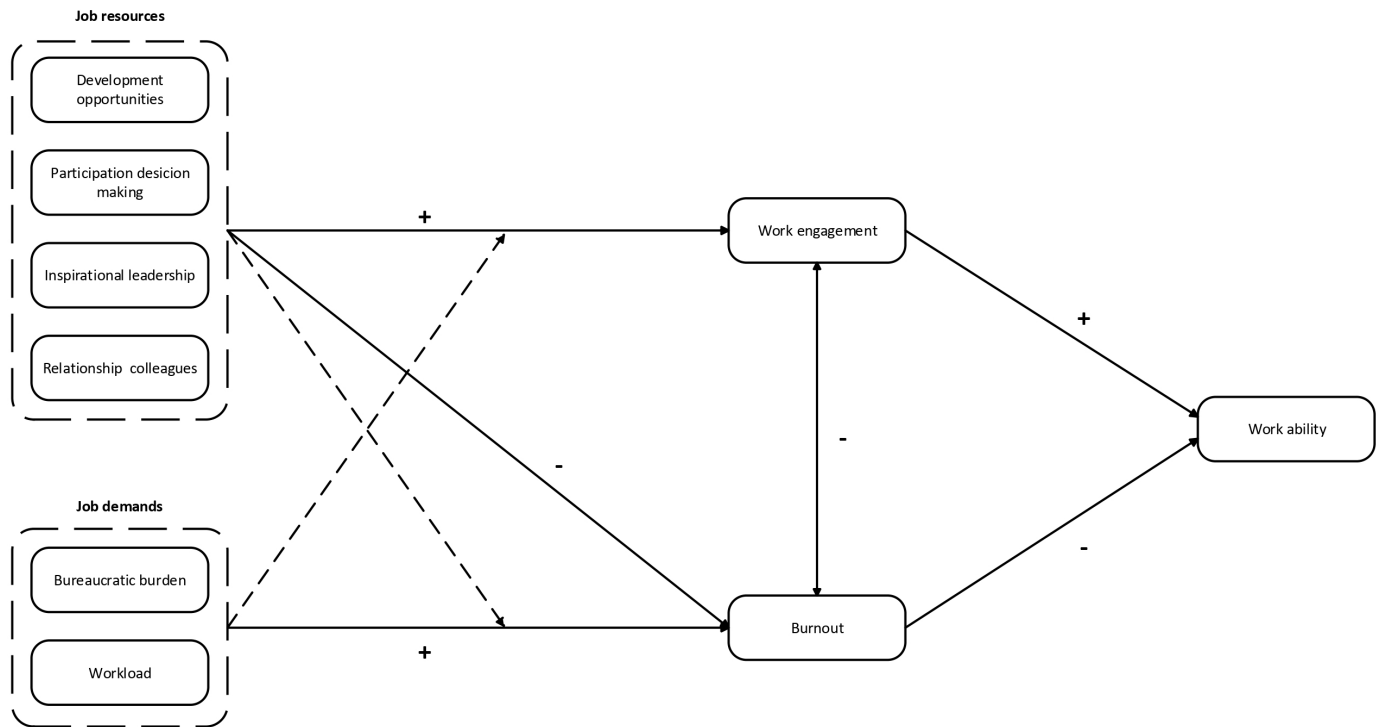
Less burned-out and more work-engaged physicians are better able to perform their work.<sup>11 30</sup> Physicians' ability to perform their work is conceptualised as the coping dimension of work ability,<sup>31</sup> that is, having the physical and mental capacity to manage certain work tasks successfully. Researchers linked impaired work ability with the risk of reduced quality, sickness absence and early retirement.<sup>32</sup> Job demands have been shown to affect work ability in various settings.<sup>32–34</sup> In particular, high workloads seem to reduce physicians' work ability.<sup>32</sup> Contrastingly, studies indicate that job resources including social relationships and support at work, development opportunities and autonomy benefit physicians' work ability.<sup>33 34</sup> Physicians who experience more work engagement report higher scores on work ability.<sup>34</sup>

The above shows the evidence base for the JD-R model in various contexts, including healthcare. Previous studies have investigated relationships of JD-R with physicians' work engagement or burnout<sup>15 16 23 35</sup> or relationships of work engagement or burnout with performance or work ability.<sup>7 17 34 36</sup> Still, studies using the JD-R model and investigating JD-R in relation to physicians' well-being and performance in one measurement model are scarce.<sup>24</sup> Furthermore, knowledge about physicians' perceptions of bureaucratic demands and inspirational leadership concerning their well-being and performance is also limited.<sup>29</sup> Finally, insight into the interaction effects of JD-R in specific (medical) contexts is welcome due to inconsistent evidence.<sup>21</sup> Healthcare organisations could use such knowledge to determine which JD-R to address to reduce physicians' burnout and enhance their engagement, subsequently, performance.<sup>24</sup> Therefore, following the JD-R model, this study investigates the relationships of JD-R with physicians' work engagement, burnout and work ability (figure 1). More specifically, this study answers the research question: to what extent does work engagement mediate the relationships of job resources with work ability, and to what extent does burnout mediate the relationships of JD-R with work ability? Investigating the potential interactions of JD-R is a subaim of this study. The obtained knowledge can inform interventions to improve physicians' working conditions, well-being and performance.

## METHODS

### Study setting and population

Data from this study were collected from April 2017 to June 2018 in the context of a nationwide well-being programme for physicians in 50 clinical departments of 16 Dutch hospitals.<sup>22 37</sup> In total, 118 residents and 531 medical specialists were invited to participate in the online survey. This study focused on medical specialists only (hereafter physicians). Of the 531 physicians invited, 385 completed the survey (72.5% response rate). Due



**Figure 1** Conceptual model. Individual job demands and resources are investigated, not all relationships are depicted for clarity reasons; dotted lines represent potential interactions of job demands and resources.

to the settings of the survey, only complete data were received. Missing data could only occur due to wrong data entry on demographic variables.

### Measurements

This study included previously validated measurements of JD-R,<sup>38 39</sup> work engagement,<sup>40</sup> burnout<sup>41</sup> and work ability.<sup>38</sup> The included JD-R were identified via a needs assessment among physicians, which was part of the nationwide well-being programme development.<sup>22</sup> In the needs assessment, physicians rated working conditions of interest to be included in the well-being programme, hence the online survey to collect data for this study.

Job demands included in this study were workload and bureaucratic burden. Workload was measured using the 6-item scale on workload of the Questionnaire on the Experience and Evaluation of Work V.2.0 (QEEW V.2.0), with responses ranging from 1 ('never') to 4 ('always').<sup>38</sup> Bureaucratic demands were measured by the Three Item Red Tape Scale (TIRT), with responses ranging from 1 ('not burdensome') to 5 ('burdensome'), 1 ('necessary') to 5 ('unnecessary') and 1 ('effective') to 5 ('ineffective').<sup>39</sup> Two researchers independently translated the English version into Dutch, which another bilingual researcher subsequently back-translated.

Job resources included development opportunities, participation in decision-making, inspirational leadership and relationships with colleagues, and were measured using the QEEW V.2.0.<sup>38</sup> The development opportunities scale (three items) and participation in decision-making scale (four items) had response options ranging from 1 ('totally disagree') to 5 ('totally agree'). Responses to

the inspirational leadership scale (four items) and relationship with colleagues scale (five items) ranged from 1 ('never') to 4 ('always').

Work engagement (nine items) was measured using the Utrecht Work Engagement Scale.<sup>40</sup> An example item is 'at my work, I feel bursting with energy'. Physicians rated their engagement on a scale from 1 ('Never') to 7 ('Always/Daily').

Burnout was measured by the exhaustion subscale (eight items) of the Oldenburg Burnout Inventory.<sup>41</sup> Exhaustion is considered the core dimension of burnout.<sup>15 42</sup> Physicians scored items from 1 ('Strongly disagree') to 5 ('Strongly agree'). An example item is 'there are days when I feel tired before I arrive at work'.

Physicians rated their work ability using eight selected items from the subscales willingness to perform and ability to perform from the QEEW V.2.0 16-item work fatigue scale.<sup>38</sup> The item selection shortened the total survey length, considering physicians' limited time and was made in collaboration with a physician in a formal leadership role. The statement 'please indicate which situation applies most to you' was repeated eight times, with different and contrasting response options on a 5-point answer scale, with higher scores indicating a better work ability: 'attention keeps dropping' to 'no problem with attention'; 'difficulty concentrating' to 'no concentration difficulties'; 'difficulty with planning own actions' to 'acting effortlessly'; 'unable to easily do different things in succession' to 'able to transition from one task to another without any problems'; 'taking risks that are actually too great' to 'taking no risks'; 'working on automatic



pilot' to 'working with attention'; 'continue working costs the greatest effort' to 'continue working effortlessly'; 'needing to overcome resistance before acting' to 'getting to activity without any problems'.

We also collected data on respondents' sex (male and female), speciality type (surgical, non-surgical, supporting and non-medical), years since completing the first registration as medical specialist (categorical) and hospital type (academic non-academic), which we included as covariates in the analysis.

### Statistical analyses

Missing values were imputed using expectation maximisation (EM). Sample characteristics were represented using descriptive statistics. Means, SD and intercorrelations were calculated to understand the variables under investigation and their mutual relationships. Mean scale scores were computed by averaging the item scores. Before computing scales, confirmatory factor analyses on the items of individual constructs were performed and the contribution of each item to the reliability of the scale was checked, that is, improvement or deterioration in Cronbach's alpha. Items with factor loadings lower than 0.30 and that affected the scale's reliability negatively were considered for deletion. Due to the low factor loadings and decrease in Cronbach's alpha, one item of the work ability scale was dropped: 'taking risks that are actually too great' to 'taking no risks'. The reliability of all included measurement scales was checked using Cronbach's alpha, with values of  $\geq 0.70$  considered acceptable.<sup>43</sup> These analyses were performed in IBM SPSS Statistics V.26.

To answer our research question, we build a structural equation model in Lavaan 0.6–9 in R V.3.6.3, following the literature about the JD-R model (figure 1).<sup>18 19</sup> Endogenous variables in our SEM—variables that are changed or determined by its relationships with other variables in the model—were work engagement, burnout and work ability. Exogenous variables—variables not determined by the model—included job demand and resources (JD-R). The SEM included the relationships of the individual job resources development opportunities, participation in decision-making, inspirational leadership and relationships with colleagues on work engagement and burnout. The SEM also included the relationships of the individual job demands bureaucratic burden and workload on burnout. Furthermore, the relationships of work engagement and burnout on work ability were included. Indirect relationships of JD-R via burnout or/and work engagement on work ability were calculated.

The SEM was specified in a way that each latent construct had three indicators. This was achieved by item parcelling, which can reduce random error, approximate latent constructs better and improve model efficiency, especially in the case of noises (eg, correlated residuals) and small sample sizes.<sup>44</sup> We applied the radial algorithm for parcelling, meaning items with the smallest distance between factor loadings were grouped together by mean averaging.<sup>44</sup>

Potential interaction effects were investigated for significant relationships of job demands with burnout and job resources with work engagement. Latent interaction terms were calculated using the double-mean centring approach in the SemTools V.0.5–5 package.<sup>45</sup>

Covariates were included to the regressions in the structural model if they showed a relationship, that is, correlation, with the dependent variables under investigation. All covariates were coded as binary variables: sex (male and female), hospital type (non-academic and academic), speciality (non-surgical and surgical), type of contract (full-time and part-time) and years since first registration as medical specialist ( $\leq 10$  years  $\geq 11$  years).

The assumption of multivariate normality was checked in R using the MVN V.5.9 package. As our data did not meet the assumption of multivariate normality, we used maximum likelihood estimation with robust SEs and a Satorra-Bentler scaled test statistic.<sup>46</sup> Model fit was assessed using the following *robust* fit indices:<sup>46</sup> Comparative Fit Index (CFI) and Tucker-Lewis index (TLI) both with values of  $\geq 0.90$  indicating acceptable fit and  $\geq 0.95$  of good fit, Root Mean Square Error of Approximation  $\leq 0.10$  indicating acceptable fit and  $< 0.06$  good fit and  $\chi^2 p \geq 0.05$  for good fit.<sup>47</sup> The fit indices are presented for the SEM without latent interaction terms as these can strongly influence the fit indices.

### Patient and public involvement

Physicians were consulted to inform the choices about the inclusion of JD-R in the online survey by means of a needs assessment. One physician with a formal leadership role informed the item selection of the work ability construct. Researchers made the final decision about which JD-R to include in the survey and physicians had no role in designing or conducting this study.

## RESULTS

### Sample characteristics

In total, 385 physicians participated in this study (table 1). About half was male (50.1%), most worked in a non-surgical speciality (64.7%) and a non-academic hospital (81.3%). Table 2 presents Cronbach's alpha's, means, SD and intercorrelations of the variables under investigation. The 26 missing values on 'years since registration' were imputed using EM.

### Structural equation model

Figure 2 depicts the results of the SEM. The robust model fit statistics were as follows:  $\chi^2 = 722.203$ ,  $df = 372$ ,  $p < 0.001$  (Satorra-Bentler correction 1.068); CFI=0.933; TLI=0.922; RMSEA=0.051,  $p = 0.562$ , 90% CI, 0.046 to 0.057, indicating acceptable model fit. Here we present standardised coefficients. The SEM model specifications and comprehensive output including unstandardised coefficients is presented in the online supplemental materials.

**Table 1** Participant characteristics

Characteristics	Valid per cent (n=385)
Sex	
Male	50.1% (n=193)
Female	49.9% (n=192)
Year since first registration	
0–5 years	24.0% (n=86)
6–10 years	26.5% (n=95)
11–15 years	21.2% (n=76)
16–21 years	16.2% (n=58)
22–45 years	12.3% (n=44)
Missing	n=26
Specialty type	
Medical	54.0% (n=208)
Surgical	35.3% (n=136)
Other	10.7% (n=41)
Hospital type	
Academic	18.7% (n=72)
Non-academic	81.3% (n=313)
Contract type	
Full-time	55.3% (n=213)
Part-time	44.7% (n=172)

The analysis showed that the job resources ‘development opportunities’ ( $\beta=0.39$ ,  $SE=0.12$ ,  $p<0.001$ ), ‘participation in decision-making’ ( $\beta=0.18$ ,  $SE=0.08$ ,  $p=0.028$ ) and ‘relationships with colleagues’ ( $\beta=0.19$ ,  $SE=0.19$ ,  $p=0.002$ ) were positively related to work engagement. Development opportunities ( $\beta=-0.20$ ,  $SE=0.08$ ,  $p=0.004$ ) were negatively related and the job demand ‘workload’ was positively to burnout ( $\beta=0.51$ ,  $SE=0.19$ ,  $p<0.001$ ). The job demand ‘bureaucratic burden’ moderated the relationship of relationships with colleagues and work engagement ( $\beta=-0.10$ ,  $SE=0.15$ ,  $p=0.015$ ). Workload moderated the relationship between participation in decision-making and work engagement ( $\beta=-0.15$ ,  $SE=0.10$ ,  $p=0.005$ ).

Work engagement mediated the relationships of development opportunities (indirect effect (ie),  $\beta=0.08$ ,  $SE=0.03$ ,  $p=0.005$ ) and relationships with colleagues (ie,  $\beta=0.04$ ,  $SE=0.04$ ,  $p=0.021$ ) with work ability. The indirect effect of participation in decision-making (ie,  $\beta=0.04$ ,  $SE=0.01$ ,  $p=0.061$ ) on work ability through work engagement was not significant. Burnout mediated the relationships of development opportunities (ie,  $\beta=0.11$ ,  $SE=0.04$ ,  $p=0.007$ ) and workload (ie,  $\beta=-0.29$ ,  $SE=0.06$ ,  $p<0.001$ ) with work ability. Work engagement ( $\beta=0.22$ ,  $SE=0.04$ ,  $p<0.001$ ) was positively related and burnout ( $\beta=-0.56$ ,  $SE=0.06$ ,  $p<0.001$ ) was negatively related to work ability. Finally, the job resource ‘inspirational leadership’ did not relate to physicians’ work engagement, burnout or work ability.

## DISCUSSION

### Main findings

Physicians reporting more job demands in terms of higher workloads and insufficient job resources in terms of development opportunities felt more burned out and less able to perform their work tasks. On the other hand, physicians who experienced sufficient job resources in terms of development opportunities, abilities to participate in decision-making and positive relationships with colleagues reported higher work engagement levels. Work-engaged physicians reported higher work ability levels than those burned-out. Work engagement mediated the relationships of development opportunities and relationships with colleagues with work ability. Burnout mediated the relationship of development opportunities and workload with work ability.

### Explanation of findings

This study provides more evidence for the health impairment and motivational process proposed by the JD-R model.<sup>4 18 19</sup> Our results confirm the importance of development resources (participation in decision-making) in comparison to social resources (relationships with colleagues) or more general job resources (participation in decision-making).<sup>29</sup> Furthermore, the findings that high workloads and excessive bureaucratic burdens reduced the positive relationships of ‘participation in decision-making’ and ‘relationships with colleagues’ with physicians’ work engagement contribute to the inconsistent literature about interaction effects.<sup>21</sup>

Workload was a substantial job demand negatively relating to physicians’ burnout and work ability. It seems that an early outcome of heavy workloads is physicians’ perception of distress. When distress endures, it makes the work less pleasant and exhausts physicians’ resources to cope with job demands, leading to reduced work ability.<sup>4 18</sup> Under high workloads, physicians’ work engagement benefitted less from being able to participate in decision-making, for example, influencing scheduling and the division of tasks. Under such circumstances, they might be hindered in influencing decisions in a way that benefits their work engagement. For example, being able to influence scheduling is of less help when the only choice is between non-preferred options due to high workloads. In addition, physicians might rather prefer to spend time on patients than participating in decision-making in the face of high workloads.<sup>48</sup> Meta-analyses on interventions to improve physicians’ well-being show that organisational strategies to alleviate workloads substantially reduce physicians’ burnout.<sup>49 50</sup> However, reducing workloads might be challenging due to increasing patient care volumes and responsibilities to safeguard the continuity of care.

Rather than reducing job demands, enhancing job resources is an alternative strategy to improve physicians’ work engagement and reduce burnout.<sup>49 50</sup> Based on our results, enhancing physicians’ professional development opportunities, ability to participate in decision-making

**Table 2** Cronbach's alpha's means, SD and intercorrelations of the main variables

Variables*	Cronbach's alpha	M (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Development opportunities	0.83	4.08 (0.69)	-													
2. Participation decision-making	0.83	3.62 (0.77)	0.44†	-												
3. Inspirational leadership	0.92	2.56 (0.84)	0.31†	0.41†	-											
4. Relationships colleagues	0.76	3.38 (0.48)	0.26†	0.36†	0.29†	-										
5. Bureaucratic burden	0.76	3.14 (0.75)	-0.20†	-0.36†	-0.22†	-0.20†	-									
6. Workload	0.79	2.88 (0.52)	-0.05	-0.32†	-0.14†	-0.16†	0.15†	-								
7. Work engagement	0.90	5.35 (0.85)	0.45†	0.39†	0.28†	0.30†	-0.22†	-0.24†	-							
8. Burnout	0.88	2.69 (0.75)	-0.31†	-0.43†	-0.27†	-0.29†	0.24†	0.56†	-0.54†	-						
9. Work ability	0.85	3.81 (0.63)	0.25†	0.30†	0.18†	0.22†	-0.18†	-0.38†	0.46†	-0.63†	-					
10. Sex	n/a	n/a	0.03	-0.12‡	0.00	0.06	-0.05	0.22†	-0.02	0.21†	-0.15†	-				
11. Years since first registration	n/a	n/a	-0.18†	-0.02	-0.13‡	-0.19†	0.02	-0.12‡	-0.02	-0.09	0.15†	-0.19†	-			
12. Specialty type	n/a	n/a	0.02	-0.08	-0.06	-0.06	0.08	0.18†	0.08	0.09	0.02	-0.04	0.00	-		
13. Hospital type	n/a	n/a	0.04	-0.15†	0.00	-0.05	0.16†	0.12‡	0.07	0.02	-0.05	0.08	0.00	0.19†	-	
14. Contract type	n/a	n/a	0.09	-0.06	0.12‡	0.17	-0.03	0.15†	-0.07	0.17†	-0.16†	0.51†	-0.22†	-0.10	0.05	-

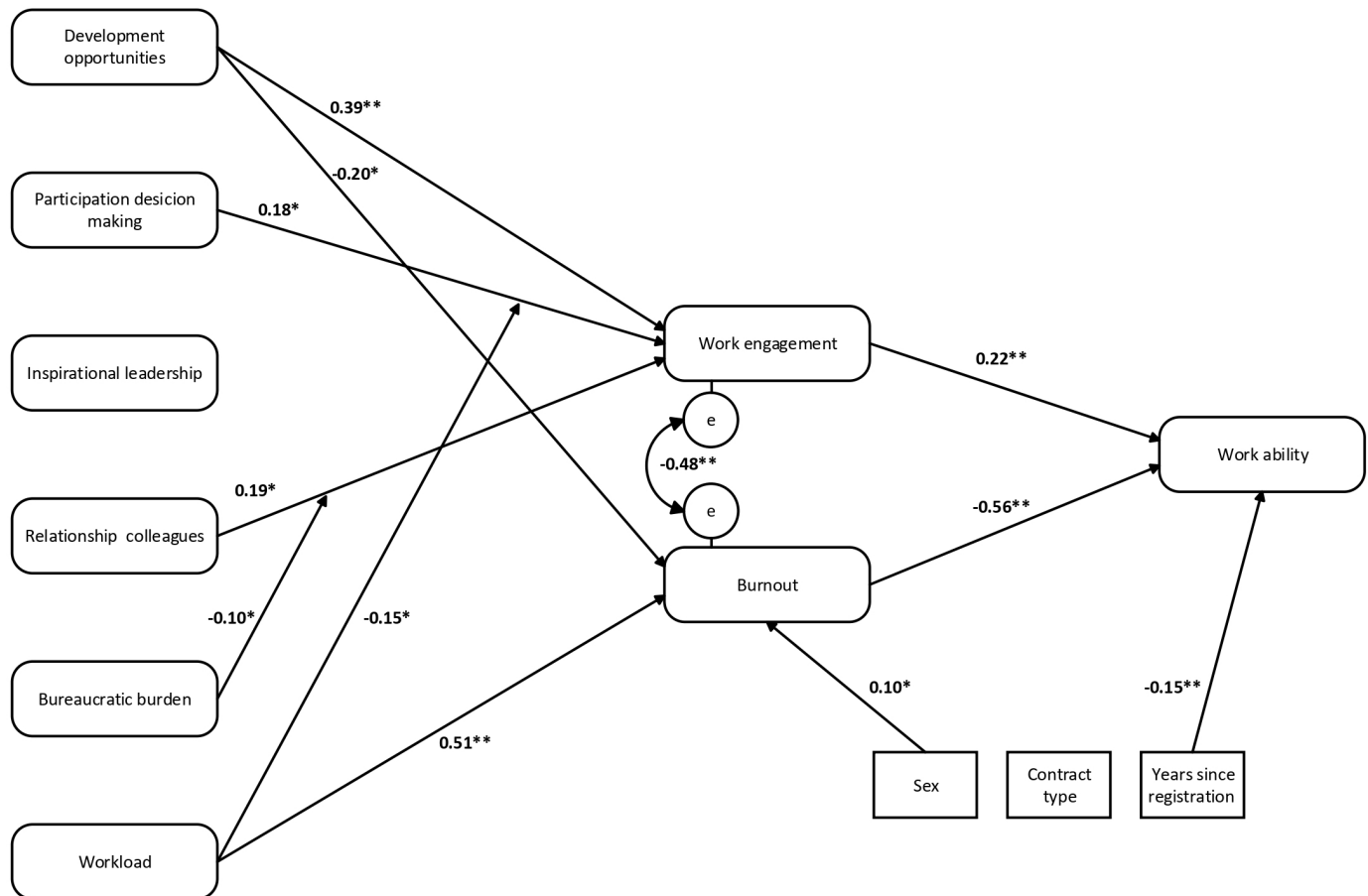
Non-parametric correlations were calculated for variables 11 to 14; correlation coefficients were rounded to two decimal places.

\*Answer scales 1. (1-5), 2. (1-4), 3. (1-4), 4. (1-4), 5. (1-5), 6. (1-4), 7. (1-7), 8. (1-5), 9. (1-5), 10. (0=male, 1=female), 11. (0= $\leq$ 10 years, 1= $\geq$ 11 years), 12. (0=non-surgical, 1=surgical), 13. (0=non-academic, 1=academic), 14. (0=fulltime, 1=part time).

†Correlation is significant at the  $p < 0.01$  level (two-tailed).

‡Correlation is significant at the  $p < 0.05$  level (two-tailed).

n/a, not applicable.



**Figure 2** Structural model. Notes: n=385; \*\*p≤0.001, \*p<0.05; standardised coefficients are displayed; measurement model and covariance between exogenous variables are not displayed.

and relationships with colleagues seem instrumental to improving physicians' occupational well-being and work ability, matching previous studies.<sup>15 17 33 34</sup>

In contrast with expectations based on the literature,<sup>11 51–55</sup> this study did not find a relationship between bureaucratic burden and physicians' burnout. It could be that some bureaucracy assists physicians' in their professional performance. Bureaucracy is concerned with standardising and centralising decision-making, formal policies and procedures to make healthcare more reliable, accessible and cost-effective.<sup>55</sup> One study found that some bureaucracy contributed to the job satisfaction of long-term care staff because it is crucial for the smooth functioning of the organisation.<sup>56</sup> Accordingly, we observed that physicians reported some usefulness of the policies and procedures they experienced, which might explain the absent relation between bureaucratic burden and burnout. However, following the literature about challenging and hindering job demands,<sup>57</sup> when bureaucracy hinders physicians in task fulfilment, it becomes detrimental to their occupational well-being.

While we did not observe a direct relationship between bureaucratic burden and physicians' burnout, bureaucracy was indirectly and negatively related to physicians' work engagement. Under excessive bureaucracy, good collegial relationships seem less beneficial to physicians'

work engagement. One potential explanation is that colleagues' efforts to help and support are less effective in the context of excessive bureaucracy. A meta-analysis found that bureaucracy negatively related to communication between employees and reduced perceptions of organisational support.<sup>58</sup>

Furthermore, this study did not find a relationship between inspirational leadership and physicians' work engagement and burnout. It is often assumed that leadership at strategic and operational levels is crucial for physicians' well-being. Leaders can shape general working conditions and organisational cultures, and inspire their followers.<sup>6 11 59</sup> This study measured the supervisor's ability to communicate a vision, a sense of work purpose and make physicians enthusiastic for their work. A previous study found that higher supervisors' leadership scores reduced physicians' likelihood of burnout and increased the possibility of satisfaction.<sup>28</sup> It would be interesting to investigate cultural and contextual differences in physicians' leadership preferences and needs. Perhaps Dutch medical specialists have other needs than being inspired by their leaders, but future research should confirm such statements.

This study confirms that work engagement and burnout relate to physicians' work ability.<sup>32–34</sup> In particular, physicians with higher burnout reported attentional lapses and

struggled with planning and conducting subsequent tasks. The benefits of work engagement are often observable in extra-role behaviours,<sup>60</sup> which might explain the stronger relationship of burnout with work ability compared with work engagement. The work ability measurement in this study reflected physicians' physical and mental capacity to manage certain work tasks successfully, predominantly referring to in-role or task performance.

Several studies have linked physicians' burnout symptoms with an increased likelihood of making medical errors;<sup>11 36 61 62</sup> this might be due to decreased work ability.<sup>34</sup> The negative consequences of impaired well-being and work ability may not directly have adverse consequences for patients. Researchers argue that exhausted physicians adopt performance protection strategies to protect their patients by dropping secondary tasks.<sup>13</sup> Still, such strategies can indirectly have adverse consequences for the quality of patient care; a longitudinal study showed that physicians' exhaustion eroded teamwork and thereby patient safety.<sup>63</sup>

### Strengths and limitations

This study contributed to the existing literature by providing more insight into relationships of JD-R with physicians' work engagement, burnout and work ability. Furthermore, this study included physicians from multiple disciplines and hospitals in the Netherlands, contributing to the generalisability of our findings.

A limitation of this study is that the work ability measurement was based on a selection of validated items instead of the validated Work Ability Index (WAI).<sup>64</sup> Although this may have compromised the validity of our measurement, the item selection guaranteed the fit of items to the study context.

Participation in this study was voluntary, which might have led to a selection bias, meaning that physicians with high or low levels of occupational well-being might have been over-represented. However, a selection bias does not necessarily influence the strength of the relationships found. The results of this study were mostly in line with the literature.<sup>15 17 29</sup>

Moreover, although physicians' data from multiple professional disciplines might contribute to the generalisability of our results, each professional discipline and workplace will have specific JD-R that this study might not have identified. Nonetheless, we selected the JD-R that were applicable to the majority of physicians—of diverse specialties—included in our previous needs assessment.<sup>22</sup> Finally, causal inferences could not be made due to the cross-sectional study design.

### Implications for research and practice

Future research could further establish linkages between physicians' workplace, well-being and performance. Given the current body of knowledge, adopting longitudinal research designs and more objective performance measures are welcomed.<sup>30 65</sup> It would be valuable if such studies investigated when job demands are perceived as

challenging or hindering and which type of job resources are most beneficial.<sup>57</sup> In addition, physicians' perceptions of bureaucracy and leadership in relation to their occupational well-being and performance deserves more attention.<sup>29</sup>

This study confirms previous findings that reducing workload is important for reducing physicians' burnout and its negative consequences for physicians' performance.<sup>11</sup> Potential strategies to reduce workload are duty hour limits, optimising electronic medical records or additional staff to support physicians.<sup>11 49 50</sup> In addition, healthcare organisations can facilitate development opportunities, participation in decision-making and support building relationships with colleagues to promote work engagement. The effectiveness of interventions will depend on the implementation context and thus always requires careful consideration.

### CONCLUSIONS

Physicians' work engagement and burnout mediated the relationships of various JD-R with their work ability. This study suggests that physicians report better work ability when experiencing low burnout and high work engagement levels. In relieving burnout and improving physicians' work engagement, hospitals may consider addressing excessive workloads and creating opportunities for physicians' professional development. Facilitating good collegial relationships and participation in decision-making may further benefit physicians' work engagement.

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**Contributors** MD conceptualised and designed the study; acquired, analysed and interpreted study data; drafted the article and gave final approval of the version to be published. RS conceptualised and designed the study; acquired, analysed and interpreted study data; critically revised the article and gave final approval of the version to be published. MS conceptualised and designed the study; analysed and interpreted study data; critically revised the article and gave final approval of the version to be published. KL, the guarantor of this study, provided feedback on the study design; acquired and interpreted study data; critically revised the article and gave final approval of the version to be published. All authors agree to be accountable for all aspects of the study in ensuring that questions related to the accuracy or integrity of any part of the study are appropriately investigated and resolved.

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**Author note** The data of this study were partly used in a different study investigating associations of job demands and resources with patient-related burnout among physicians. While this study investigates the same job demands and resources, all dependent variables in this study—work engagement, burnout and work ability—have not previously been investigated.

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