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Associations among job demands and resources, work engagement, and psychological distress: fixed-effects model analysis in Japan

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Abstract: Objectives: We examined the associations among job demands and resources, work engagement, and psychological distress, adjusted for time-invariant individual attributes. **Methods:** We used data from a Japanese occupational cohort survey, which included 18,702 observations of 7,843 individuals. We investigated how work engagement, measured by the Utrecht Work Engagement Scale, was associated with key aspects of job demands and resources, using fixed-effects regression models. We further estimated the fixed-effects models to assess how work engagement moderated the association between each job characteristic and psychological distress as measured by Kessler 6 scores. **Results:** The fixed-effects models showed that work engagement was positively associated with job resources, as did pooled cross-sectional and prospective cohort models. Specifically, the standardized regression coefficients (β) were 0.148 and 0.120 for extrinsic reward and decision latitude, respectively, compared to -0.159 and 0.020 for role ambiguity and workload and time pressure, respectively ($p < 0.001$ for all associations). Work engagement modestly moderated the associations of psychological distress with workload and time pressure and extrinsic reward; a one-standard deviation increase in work engagement moderated their associations by 19.2% ($p < 0.001$) and 11.3% ($p = 0.034$), respectively. **Conclusions:** Work engagement was associated with job demands and resources, which is in line with the theoretical prediction of the job demands-resources model, even after controlling for time-invariant individual attributes. Work engagement moderated the association between selected aspects of job demands and resources and psychological distress.

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Key words: Industrial psychology, Japan, Mental health

Introduction

Work engagement, which is defined as a positive, fulfilling, work-related state of mind described by experiences of energy, dedication, and absorption at work, is considered to capture a positive aspect of workers' well-being¹. Considering the close relationship between work engagement and workers' job performance and health outcomes, as evidenced by preceding studies^{2,6}, it is important to investigate how work engagement is associated with job characteristics.

The job demands-resources (JD-R) model provides a theoretical framework to address this issue^{7,9}. Job demands refer to the aspects of work that require sustained physical and psychological effort and, thus, are associated with physical and psychological costs⁸. Meanwhile, job resources refer to the physical, psychological, social or organizational aspects of jobs that reduce job demands and the associated physiological and psychological costs; are functional in receiving work-related goals; and/or stimulate personal growth, learning, and development⁸. The JD-R model specifies how work engagement may be produced by two specific sets of working conditions that can be found in every organizational context: job demands and job resources⁹.

Based on the JD-R model, it can be argued that job resources can enhance work engagement⁹. Indeed, studies

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have shown that work engagement was positively associated with various aspects of job resources including decision latitude, social support in the workplace, and extrinsic reward⁸⁻¹⁵. By contrast, the association between job demands and work engagement may differ across types of job demands. Job demands can be divided into two types: “challenges” (such as workload and time pressure), which may have potential gains for individuals, and “hindrances” (such as role ambiguity), which may constrain or interfere with an individual’s work achievement^{16,17}. Studies have reported that work engagement is positively associated with challenges and negatively associated with hindrances¹⁸⁻²⁰.

A key limitation to these preceding studies, most of which have been cross-sectional^{8,10,11,19} or prospective cohort analyses^{9,12-15,18}, is that the estimation results cannot be free from biases related to unobserved time-invariant confounders. Cross-sectional studies can control for observed but not unobserved time-invariant confounders. Prospective cohort studies can alleviate simultaneity biases, but cannot fully control for time-invariant confounders as with cross-sectional studies.

The current study is novel in two ways compared to preceding studies that have addressed the association between job characteristics and work engagement. First, we assessed the validity of previous observations by controlling for time-invariant individual attributes. Because both job characteristics and work engagement are subjectively assessed and self-reported in most cases, their observed associations are likely to be biased due to unobserved individual attributes. To control for their effects, we conducted a fixed-effects model analysis, which can control for time-invariant individual attributes. This analysis was expected to help assess the empirical relevance of the JD-R model as a theory that explains the association between job demands/resources and work engagement. We hypothesized that work engagement would be associated with job characteristics, even after controlling for time-invariant individual attributes. Specifically, we considered two aspects of job demands (workload and time pressure [as challenges] and role ambiguity [as a hindrance]) and four aspects of job resources (decision latitude, supervisor support, co-worker support, and extrinsic reward). We predicted that work engagement would be positively associated with workload and time pressure and the four aspects of job resources and negatively associated with role ambiguity.

Second, we analyzed the extent to which work engagement would moderate the association between job characteristics and psychological distress, an issue that has been largely understudied. It is argued that engaged employees have a sense of energetic and effective connection with their work activities and hence see themselves as being able to deal with high job demands and other adverse job characteristics¹. In other words, work engagement is ex-

pected to help workers to control and successfully impact on their work environment²². We therefore hypothesized that work engagement would moderate the adverse impact of job characteristics on psychological distress. Although some studies have shown a moderating effect of work engagement on the association between psychological climate in the workplace and individual well-being^{23,24}, they used cross-sectional data. We addressed this issue by applying fixed-effects models to longitudinal data.

Materials and Methods

Study sample

We used panel data from four survey waves of an occupational cohort study on social class and health in Japan (Japanese Study of Health, Occupation, and Psychosocial Factors Related Equity [J-HOPE]). The first wave was conducted from October 2010 to December 2011; the following waves were conducted approximately one year after the preceding wave. The study population consisted of employees working for thirteen firms, three of which participated only in the first three waves. The surveyed firms covered twelve industries, while the surveyed respondents were classified into nine occupation types. The original sample consisted of 10,742, 11,393, 10,977, and 6,603 respondents in the first to the fourth waves, respectively (response rates: 77.0%, 81.7%, 78.6%, and 67.0%, respectively). The original dataset included 39,715 observations of 14,162 individuals (10,569 men and 3,593 women) who joined at least one wave. The attrition rates were 18.3%, 13.1%, and 16.5% in the second, third, and fourth waves, respectively.

To compare cross-sectional and fixed effects models, we focused on individuals who joined at least two consecutive waves. Excluding respondents with missing work engagement and other important variables, we used 30,998 observations of 10,207 individuals (7,760 men and 2,447 women; 78.1% of the original sample observations; 72.1% of the original sample individuals). Among these, 2,590 individuals joined all four waves, 4,650 joined three waves, and 2,967 joined only two consecutive waves.

The Research Ethics Committee of the Graduate School of Medicine and Faculty of Medicine, The University of Tokyo (No. 2772), Kitasato University Medical Ethics Organization (No. B12-103), and the Ethics Committee of Medical Research, University of Occupational and Environmental Health, Japan (No. 10-004) reviewed and approved the aims and procedures of the present study. This analysis was conducted using the J-HOPE dataset as of 22 December 2016.

Measures

Work engagement, job demands and resources, and psychological distress

To assess work engagement, we used the nine-item Japanese version of the Utrecht Work Engagement scale (UWES-9), of which the reliability, factorial invariance, and construct validity have been validated^{25,26}. The nine items of the UWES-9 are subdivided into three groups of three measuring vigor, dedication, and absorption on a seven-point scale (0 = never to 6 = always [every day]). We used the average of the nine items to assess work engagement.

We focused on two aspects of job demands: workload and time pressure as challenges, and role ambiguity as a hindrance because the associations between these aspects and work engagement have been considered by many preceding studies^{14,15,19,20} and they were available from the J-HOPE dataset. We assessed workload and time pressure using the Japanese version of the Job Content Questionnaire (JCQ), which has been reported to have acceptable internal consistency reliability and construct validity^{27,28}. The JCQ has a five-item scale measuring workload and time pressure (response range: 12-48). We calculated its total score based on the JCQ User's Guide²⁷. Meanwhile, we assessed role ambiguity based on the Japanese version of the National Institute for Occupational Safety and Health Generic Job Stress Questionnaire (NIOSH-GJSQ), which has been reported to have acceptable internal consistency reliability and construct validity^{29,30}. We calculated the total score of role ambiguity based on the six-item scale (response range: 6-42).

Regarding job resources, we considered four aspects: decision latitude, supervisor support, co-worker support, and extrinsic reward. Using the Japanese version of the JCQ^{27,28}, we assessed decision latitude (nine-item scale, response range: 24-96), supervisor support (four-item scale, response range: 4-16), and co-worker support (four-item scale, response range: 4-16). For extrinsic reward, we employed the Japanese short version of the Effort-Reward Imbalance Questionnaire (ERIQ), which has been reported to have acceptable internal consistency reliability and construct validity^{31,32}. We computed an extrinsic reward scale (seven items, response range: 7-28) based on the ERIQ.

We also used Kessler 6 (K6) scores to measure psychological distress^{33,34}. The reliability and validity of the K6 scale have been demonstrated in a Japanese population^{34,35}. From the survey, we first obtained the respondents' assessments of their psychological health using a six-item questionnaire: "During the past 30 days, about how often did you feel a) nervous, b) hopeless, c) restless or fidgety, d) so depressed that nothing could cheer you up, e) that everything was an effort, and f) worthless?"

We summed these responses on a five-point scale (0 = none of the time; 4 = all of the time) to construct a K6 score (range: 0-24).

Our regression analyses used all of these measures of work engagement, job demands and resources, and psychological distress as continuous variables. Cronbach's alpha coefficients in the sample for those variables are presented in Table 2.

Covariates

For socioeconomic and sociodemographic covariates, we used sex, age, educational level (high school or below, junior college, college, and graduate school), job classification (managerial, non-manual, manual, and other), the number of household members, and income (adjusted for household size by dividing by the square root of the number of household members). We also controlled for three types of health behaviors: smoking (not smoking, quit smoking, and smoking), alcohol consumption (never, sometimes, and almost every day), and physical activity (never, light exercise once or more a week, moderate or higher exercise once or twice a week, and moderate or higher exercise three times or more a week).

Statistical analyses

After examining pairwise correlations across key variables, we estimated three types of linear regression models to explain work engagement by job demands and resources as well as covariates. First, we estimated a pooled cross-sectional regression model to capture the co-occurring association between job characteristics and work engagement. Second, we estimated a prospective cohort regression model to examine how job characteristics could predict work engagement in the subsequent wave, after controlling for work engagement at baseline (i.e., its one-year-lag value). Note that the respondents who participated in four (three) waves were included three times (twice) in this regression model. Third, we estimated the fixed-effects regression models to control for time-invariant individual attributes²¹. In these models, all variables, both continuous and categorical, were mean-centered for each individual. These transformations removed time-invariant individual variables, both observed and unobserved, from the regression model and hence freed estimation results from biases caused by those variables. In all of these regression analyses, we estimated two types of models: (i) the joint model, which used six job characteristics jointly as regressors, and (ii) the separate models, which used each characteristic separately to consider the possibility that the estimation results may be affected by correlations among job characteristics. The main focus was on the standardized regression coefficients (β) of job characteristics, along with their 95% confidence intervals (CI), which allow for comparison of the

Table 1. Key characteristics of participants at baseline^a

	Total	Men	Women
Age (years)			
<i>M</i>	40.1	40.9	37.7
<i>SD</i>	10.5	10.5	10.1
Educational level (%)			
High school or below	38.8	39.6	36.3
Junior college	16.5	11.9	31.1
College	34.3	36.1	28.4
Graduate school	10.4	12.4	4.1
Job classification (%)			
Managerial worker	16.7	21.2	2.2
Non-manual worker	47.0	41.7	64.0
Manual worker	24.7	26.8	17.9
Other worker	11.6	10.3	15.8
Smoking (%)			
Not smoking	59.9	52.1	84.7
Quit smoking	11.9	14.3	4.5
Smoking	28.1	33.6	10.9
Alcohol consumption			
Never	36.0	30.6	52.9
Sometimes	36.4	36.6	35.7
Almost every day	27.6	32.7	11.4
Physical activity			
Never	61.6	58.2	72.4
Light exercise once or more a week	21.5	23.2	16.1
Moderate or higher exercise once or twice a week	13.4	14.6	9.3
Moderate or higher exercise three times or more a week	3.5	3.9	2.2
Income (annual, thousand yen, household-size-adjusted)			
<i>M</i>	4,314	4,464	3,838
<i>SD</i>	2,126	2,048	2,292
Number of family members			
<i>M</i>	2.9	3.0	2.7
<i>SD</i>	1.50	1.48	1.54
<i>n</i>	10,207	7,760	2,447

^a Baseline was waves 1, 2, and 3 for 7,130, 2,467, and 610 individuals, respectively.

effect sizes of the associations with work engagement.

We further estimated the fixed-effects models to explain K6 scores using two types of models, as with work engagement. The joint model explained K6 scores by all six job characteristics, work engagement, and their interaction terms. The separate models used each job characteristic. For both models, we focused on the estimated coefficients of the interaction terms between each job characteristic and work engagement to examine the moderating effect of work engagement on the association between job characteristics and psychological distress. For each job characteristic, we computed the ratio of the estimated

coefficient of its interaction term with work engagement to that of its own term to assess how a one standard deviation increase in work engagement moderated the association between that job characteristic and psychological distress.

Results

Table 1 summarizes the key characteristics of respondents measured at baseline (when they started participation in the survey). Table 2 presents the pairwise correlation coefficients to help roughly capture their relation-

Table 2. Pairwise correlation coefficients across key variables and Cronbach's α ($N = 30,998$)

	Pairwise correlation coefficient ^a							Cronbach's α
	1	2	3	4	5	6	7	
1. Work engagement								0.937
2. Psychological distress	-0.305							0.716
3. Workload and time pressure	0.070	0.260						0.692
4. Role ambiguity	-0.475	0.344	0.077					0.879
5. Decision latitude	0.414	-0.120	0.212	-0.374				0.758
6. Supervisor support	0.342	-0.220	-0.058	-0.448	0.335			0.906
7. Co-worker support	0.323	-0.214	0.024	-0.360	0.316	0.477		0.808
8. Extrinsic reward	0.386	-0.374	-0.105	-0.466	0.341	0.514	0.407	0.760

^a Baseline was waves 1, 2, and 3 for 7,130, 2,467, and 610 individuals, respectively. $p < .001$ for all.

ships unadjusted for other variables or covariates, along with the Cronbach's alpha coefficients in the sample (rightmost column). As seen in the table, work engagement was positively associated with four aspects of job resources and negatively associated with role ambiguity. Its association with workload and time pressure was positive but its magnitude was limited compared to that of other job characteristics. Meanwhile, psychological distress was positively associated with two aspects of job demands and negatively associated with work engagement and four aspects of job resources.

Table 3 compares the estimation results obtained from the pooled cross-sectional, prospective cohort, and fixed-effects models, with the upper and lower parts of the table showing the joint and separate models, respectively. All joint models showed that work engagement was negatively associated with role ambiguity and positively associated with all other job characteristics. Three things should be noted. First, the sizes of the estimated coefficients in the fixed-effects models were all smaller than those in pooled cross-sectional models and larger than those in prospective cohort models. Second, the magnitude of the association with work engagement differed substantially across job characteristics. According to the fixed-effects model, the magnitude of the standardized regression coefficient was highest for role ambiguity (-0.159), which represents the hindrance side of job demands, followed by extrinsic reward (0.148) and decision latitude (0.120), two key aspects of job resources. In comparison, workload and time pressure, which represent the challenge aspect of job demands, had a relatively limited association (0.020); the same was true of supervisor support (0.063) and co-worker support (0.074), which are categorized as job resources. Third, compared to the joint model, the separation models tended to show larger associations between job characteristics and work engagement. The noticeable exception was workload and time pressure; their estimated association became negative and non-significant (-0.014).

Table 4 presents the estimation results of the fixed-effects regression models to explain K6 scores by job characteristics, work engagement, and their interactions (along with covariates). The focus was on the coefficients of the interaction terms (middle columns) and ratios of the mediating effects of work engagement (rightmost columns). The joint model (upper part) showed that K6 scores were associated with all job characteristics (except decision latitude) in expected directions and negatively associated with work engagement. The interaction terms of four job characteristics (other than decision latitude and supervisor support) with work engagement had significant coefficients with opposing signs to those for the individual terms. The computed sizes of the moderation effects of work engagement showed that a one-standard-deviation increase in work engagement moderated 19.2%, 11.3%, and 40.1% of the associations of K6 scores with workload and time pressure, extrinsic reward, and co-worker support, respectively. The statistical significance of the ratios of moderating effects for role ambiguity and supervisor support suggest that their moderating effects were more ambiguous. The separate models (lower part) produced results largely similar to those in the joint model, although the ratio of the moderating effect for role ambiguity turned modestly significant.

Discussion

Using data from a Japanese occupational cohort survey, we examined the associations among job characteristics, work engagement, and psychological distress, and adjusted for individual time-invariant attributes. We obtained three noteworthy observations. First, work engagement was positively associated with job resources — especially with extrinsic reward and decision latitude, and to a lesser extent with supervisor support and co-worker support. The results were consistent with various cross-sectional and prospective cohort studies⁸⁻¹⁵, although they suggest that the associations between job characteristics

Table 3. Estimated associations between job characteristics and work engagement^a ($N = 30,998$ observations of 10,207 individuals)

Dependent variable = work engagement	Pooled cross-sectional		Prospective cohort ^b		Fixed-effects	
	β^c	95% CI ^d	β	95% CI	β	95% CI
(1) Joint model						
Job demands						
Workload and time pressure	0.094 ***	(0.080, 0.108)	0.017 ***	(0.006, 0.028)	0.020 ***	(0.008, 0.033)
Role ambiguity	-0.255 ***	(-0.272, -0.238)	-0.045 ***	(-0.058, -0.032)	-0.159 ***	(-0.173, -0.145)
Job resources						
Decision latitude	0.218 ***	(0.201, 0.235)	0.044 **	(0.032, 0.056)	0.120 ***	(0.104, 0.135)
Supervisor support	0.047 ***	(0.031, 0.063)	-0.015 ***	(-0.028, -0.002)	0.063 ***	(0.050, 0.076)
Co-worker support	0.095 ***	(0.080, 0.110)	0.001	(-0.012, 0.014)	0.074 ***	(0.062, 0.087)
Extrinsic reward	0.163 ***	(0.146, 0.181)	0.031 ***	(0.018, 0.044)	0.148 ***	(0.132, 0.163)
(2) Separate models						
Job demands						
Workload and time pressure	0.062 ***	(0.045, 0.079)	0.013 *	(0.003, 0.023)	-0.014	(-0.028, 0.000)
Role ambiguity	-0.442 ***	(-0.457, -0.426)	-0.056 ***	(-0.067, -0.045)	-0.258 ***	(-0.273, -0.244)
Job resources						
Decision latitude	0.411 ***	(0.394, 0.429)	0.056 ***	(0.044, 0.068)	0.223 ***	(0.207, 0.240)
Supervisor support	0.325 ***	(0.309, 0.341)	0.017 **	(0.006, 0.028)	0.182 ***	(0.169, 0.195)
Co-worker support	0.321 ***	(0.305, 0.337)	0.022 ***	(0.010, 0.033)	0.165 ***	(0.152, 0.179)
Extrinsic reward	0.377 ***	(0.360, 0.393)	0.042 ***	(0.030, 0.053)	0.258 ***	(0.242, 0.274)

^aAdjusted for gender, age, educational level, job classification, smoking, alcohol consumption, physical activity, income, and the number of family members. ^b Additionally controlled for work engagement at baseline. ^c Standardized regression coefficient.

^d Confidence interval.

*** $p < .001$, ** $p < .01$, * $p < .05$.

and work engagement may be overestimated without controlling for time-invariant individual attributes. The current study also highlighted the relative importance of extrinsic reward as a correlate of work engagement compared to other aspects of job resources. Judging by the sizes of the standardized regression coefficients, we suspect that it is difficult to fully compensate for a shortage of extrinsic reward by enhancing, for example, supervisor support or co-worker support.

Second, regarding the association between job demands and work engagement, the results were partly supportive of the view that challenge and hindrance aspects were positively and negatively associated with work engagement, respectively^{18,19}. We found that role ambiguity, which is a hindrance aspect of job demands, had a modest negative association with work engagement. However, it should be noted that the magnitude of the negative association between work engagement and workload and time pressure was limited, and that the separation model produced a negative and non-significant association. An ambiguous association between workload and time pressure and work engagement may be attributable to their two opposing aspects: feeling busy at work may create a feeling of being important for their company or organization, which may in turn enhance work engagement, whereas

heavy workload, especially if subjectively assessed to be excessive, may reduce workers' positive feelings towards their work. A balance between workload and time pressure may depend on their strengths as well as personal attributes for subjective assessment, likely making their association with work engagement ambiguous.

In addition to the results that were generally in line with the theoretical prediction of the JD-R model, we observed that work engagement moderated associations between job characteristics and psychological distress, albeit selectively rather than uniformly across job characteristics. Several previous studies have reported that work engagement has a positive association with workers' mental health²⁻⁶, and the present findings supported this. Our observations further revealed that work engagement had a modest moderating effect on workload and time pressure, and extrinsic reward. These findings may have important implications for workers' well-being. Considering that workload and time pressure were closely associated with psychological distress but not with work engagement, we can argue that the negative impact of workload and time pressure can be mitigated by enhanced work engagement through interventions to improve other job characteristics. By contrast, it may not be easy to use work engagement to alleviate the psychological impact of

Table 4. Estimated associations among job characteristics, psychological distress, and work engagement ^{a, b} (*N* = 30,998 observations of 10,207 individuals)

Dependent variable = K6 scores	Individual term (A)		Interaction term with work engagement (B)		Moderating effect of work engagement	
	β^c	95% CI ^d	β	95% CI	- (B) / (A) (%)	95% CI
(1) Joint model						
Job demands						
Workload and time pressure	0.128 ***	(0.113, 0.142)	-0.025 ***	(-0.038, -0.011)	19.2 ***	(8.8, 29.6)
Role ambiguity	0.103 ***	(0.086, 0.120)	-0.010 ***	(-0.026, -0.006)	9.9	(-5.7, 25.5)
Job resources						
Decision latitude	0.001	(-0.017, 0.019)	-0.002	(-0.017, 0.013)	-	-
Supervisor support	-0.022 **	(-0.037, -0.007)	-0.010 **	(-0.023, -0.004)	-44.5	(-113.2, 24.2)
Co-worker support	-0.036 ***	(-0.051, -0.022)	0.015 ***	(0.001, 0.028)	40.1 *	(1.6, 78.6)
Extrinsic reward	-0.150 ***	(-0.168, -0.132)	0.017 ***	(0.001, 0.033)	11.3 *	(0.9, 21.8)
Work engagement	-0.162 ***	(-0.183, -0.141)				
(2) Separate models						
Job demands						
Workload and time pressure	0.156 ***	(0.141, 0.171)	-0.028 ***	(-0.041, -0.014)	17.8 ***	(9.0, 26.5)
Role ambiguity	0.156 ***	(0.139, 0.173)	-0.019 ***	(-0.032, -0.005)	12.0 *	(3.1, 20.9)
Job resources						
Decision latitude	-0.041	(-0.060, 0.022)	0.008	(-0.006, 0.022)	-	-
Supervisor support	-0.098 **	(-0.113, -0.083)	0.008 **	(-0.004, -0.020)	8.1	(-4.2, 20.5)
Co-worker support	-0.081 ***	(0.095, 0.066)	0.021 ***	(0.008, 0.033)	25.7 **	(10.1, 41.3)
Extrinsic reward	-0.207 ***	(0.225, 0.190)	0.028 ***	(0.015, 0.041)	13.7 ***	(7.3, 20.0)

^a Adjusted for gender, age, educational level, job classification, smoking, alcohol consumption, physical activity, income, and the number of family members. ^b The estimated coefficients of work engagement are not reported to save space. ^c Standardized regression coefficient. ^d Confidence interval.

*** $p < .001$, ** $p < .01$, * $p < .05$.

poor extrinsic reward, as work engagement was shown to be greatly reduced by poor extrinsic reward.

We acknowledge that the current study has several limitations, in addition to the male dominated structure of the study sample, potential biases due to attrition, and its limited representativeness of the entire working population in Japan. First, this study did not identify the one-way causality from job characteristics to work engagement or psychological distress, even though it controlled for time-invariant individual attributes. In particular, we cannot exclude the possibility of reverse causation from work engagement to subjective job assessment, as suggested by previous studies^{22,37}. Second, the current study considered only six job characteristics as correlates of work engagement. The analysis should be extended to cover other aspects of challenges (e.g., cognitive demands) and hindrances (e.g., role conflict and organizational politics) as well as personal resources (e.g., self-efficacy, self-esteem, and resilience) to more comprehensively assess the relevance of work engagement for workers' well-being within the framework of the JD-R model²². Third, the relevance of work engagement for workers' well-being should be discussed in a more com-

prehensive manner, considering its possible associations with aspects of workers' well-being other than psychological distress, such as burnout, job/life satisfaction, and occupational health^{1,2,5,8,9,13,15}.

Despite these limitations, the current study confirmed that work engagement is associated with job demands and resources in a manner largely consistent with the JD-R model, and that it moderated the association between selected aspects of job demands and resources and psychological distress. The results underscore the need for more in-depth knowledge of work engagement to construct intervention measures to improve workers' well-being.

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