

The relative importance of various job resources for work engagement: A concurrent and follow-up dominance analysis

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Abstract

Job resources are known to be key drivers of work engagement, but surprisingly, little is known about the relative importance of specific job resources in comparison to one another. We investigated the relative importance of eight job resources both cross-sectionally and over a 3-year time period. We hypothesized that job resources at the task level are “universally” important and contribute relatively more to work engagement than other types of job resources. We employed dominance analyses to a large cross-sectional data set ($N=11,468$ from 87 organizations), focusing specifically on 11 jobs, and to a two-wave data set ($N=2,334$). Three job resources emerged as the most important both for concurrent and future work engagement across the jobs and samples: skill discretion, job feedback, and team empowerment. Practically, this study suggests that interventions to enhance work engagement could focus on increasing skill discretion and job feedback and on building team empowerment.

JEL: L200 Firm Objectives, Organization, and Behavior: General

Keywords

Longitudinal modeling, organizational behavior, human resource management, well-being, motivation, work engagement

Research on work engagement—feeling vigorous, dedicated, and absorbed at work—has flourished during the past two decades and provided robust support for the benefits of work engagement both for employees and organizations (Bailey et al., 2015). According to Job Demands–Resources (JD-R) theory (Bakker & Demerouti, 2017), job resources are the key drivers of work engagement, and job demands are expected to have a less direct impact. A great deal of research using different methodologies, ranging from diary studies (e.g., Xanthopoulou et al., 2009) to long-term follow-up studies with time lags of several years (e.g., Hakanen et al., 2008), has supported this theory and found that job resources are important for work engagement. However, little is known about the relative importance of different job resources in comparison to one another. A central question is whether some job resources are key drivers for work engagement across different jobs, or—following JD-R

theory (Bakker & Demerouti, 2017)—whether certain job resources are salient in some jobs but less so in others.

Our study sets out to investigate the relative importance of eight different job resources for work engagement. To do this, we employed both cross-sectional and follow-up data representing various industries and used dominance analysis (DA) for statistical analysis. Thus far, DA has been an underutilized multiple-regression

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approach in occupational psychology and management literature, although its wider use has been advocated to gain an appropriate understanding of the role-played by each predictor in a regression equation (e.g., Tonidandel & LeBreton, 2011). Both theoretically and practically, it would be valuable to identify which job resources are “universally” related to concurrent and future work engagement and which job resources are more context and time specific. Recently, the assumed universality of job resources has also been challenged by asking why, when and for whom job resources are important (Van Veldhoven et al., 2020).

JD-R theory underlines the motivating potential of all job resources and is accordingly unspecific about whether certain job resources could be more important for work engagement than others. In contrast, earlier motivational theories (Hackman & Oldham, 1980; Herzberg et al., 1959) proposed that job resources at the task level are the crucial determinants of employee well-being and motivation. Thus in essence, the unsolved question has remained whether the key drivers of work engagement in different jobs have some general pattern (“universalism”) or whether different job resources act as the main contributors to work engagement in different jobs (“context-specificity”).

With this study, we aim to contribute to JD-R theory by testing whether certain job resources, that is, task resources are more important drivers of work engagement than other types of job resources, regardless of the job itself. We also tested whether the same job resources are the most important both concurrently and over a 3-year follow-up period. On the basis of earlier motivational theories and recent meta-analyses (e.g., Crawford et al., 2010; Hackman & Oldham, 1980; Halbesleben, 2010; Herzberg et al., 1959; Lesener et al., 2020), we expected task-level job resources to be more important for work engagement than other types of job resources (organization of a job, interpersonal and social, and organizational) regardless of the actual job. Over the past two decades, finding the best ways to boost work/employee engagement has been a highly targeted issue in business and consultancy due to its impact on job performance and other positive outcomes (Schaufeli, 2014). Therefore, identifying the most important drivers of work engagement is also highly valuable for practice.

Work engagement in job demands–resources theory

Work engagement has been defined as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli et al., 2002, p. 74). Thus, engaged workers have high levels of energy and are involved, fully focused on, and happily engrossed in their work. JD-R theory defines job resources as the aspects of a job that help employees meet various job demands, enable the achievement of goals, and promote learning,

growth, and engagement (Demerouti et al., 2001). Job demands, in turn, primarily from the breeding ground for job strain and burnout (Schaufeli & Bakker, 2004).

Job resources may exist at the levels of task (e.g., job autonomy), organization of the job (e.g., role clarity), interpersonal and social relations (e.g., team climate), and the larger organization (e.g., organizational justice) (Bakker & Demerouti, 2007). According to JD-R theory, any job resource may be important for boosting work engagement, whereas (high) job demands are uniquely related to job strain and burnout (Schaufeli & Taris, 2014).

Indeed, research has shown that job resources are the most important predictors of work engagement (Lesener et al., 2019); and that job demands are less important predictors (Halbesleben, 2010; Lesener et al., 2019). More generally, a vast amount of empirical research supports the central proposition in JD-R theory that many different job demands and resources may determine occupational health and well-being. In contrast to earlier stress models (e.g., Karasek, 1979), JD-R theory proposes that every organization or job may be characterized by different job demands and resources. Indeed, in their review of JD-R theory, Schaufeli and Taris (2014) identified no less than 31 different job resources, 12 personal resources, and 30 job demands investigated in previous JD-R studies.

From a methodological point of view, previous studies have often used structural equation modeling and studied job resources by combining a set of job characteristics that indicate a latent “job resource” factor (e.g., Hakanen et al., 2008; Schaufeli & Bakker, 2004; Schreurs et al., 2011; Simbula et al., 2011). Therefore, little is known about the relative importance of each job resource as such. Moreover, several studies have tested the role of individual job resources and their interaction effects on work engagement (e.g., Bakker et al., 2007; Hakanen et al., 2005). Again, these studies have shed light on the positive relationship between job resources and work engagement, but they have focused separately on each job resource and not systematically compared different job resources.

Earlier motivational theories such as the job characteristics theory (JCT; Hackman & Oldham, 1980) and the two-factor theory of motivation (Herzberg et al., 1959) are more restrictive theories than JD-R theory in the sense that they underline the importance of task characteristics for employee motivation. JCT specifies five task-level job characteristics, for example, task variety and feedback, which are considered crucial for positive motivational states. The two-factor theory, in turn, hypothesizes that work characteristics (tasks), advancement and other such proximal job qualities are “satisfiers,” whereas supervision, interpersonal resources and, for example, working conditions are “hygiene factors” and as such only potential “dissatisfiers.”

These theories currently gain little attention compared to JD-R theory, but interestingly, they at least, to some extent, highlight the strength of JD-R theory, namely its

flexibility and comprehensiveness, as it covers a much wider range of potential drivers of employee well-being. Importantly however, they also suggest that it may be possible to make more precise predictions of the most important job resources for work engagement.

Empirically, research has indicated that many types of job resources may boost work engagement (Bakker & Demerouti, 2007, 2017). However, based on previous meta-analyses and reviews, it seems that resources at the task level are more salient for work engagement than other job resources. Halbesleben's (2010) meta-analysis found that of the various job resources, feedback had the highest estimated population correlation with both vigor and dedication, the core dimensions of work engagement, followed by job autonomy/control. Social support and organizational climate had somewhat lower correlations with work engagement. Moreover, job demands, such as work overload, were only very weakly related to work engagement.

Similarly, in a meta-analysis by Crawford et al. (2010), work engagement had the highest correlations with job variety, work-role fit, and opportunities for development, but lower correlations with social support and positive climate, and lower although positive correlations with various challenging job demands. Moreover, a work engagement meta-analysis by Christian et al. (2011) found that the highest correlations between job resources and work engagement were for task variety, task significance, and proactive personality. Correlations were somewhat lower for social support, leader-member exchange (LMX) and transformational leadership. Finally, a recent meta-analysis of the drivers of work engagement concluded that the job resources that are most connected to the individual employee (e.g., job control, development opportunities, i.e., task resources) seem to have the strongest impact on work engagement (Lesener et al., 2020).

In summary, based on JD-R theory (Bakker & Demerouti, 2017) and a multitude of research, we can conclude that many different types of job resources are important for work engagement. However, earlier motivational theories and existing meta-analyses suggest that task-level resources may be stronger drivers of work engagement than, for example, interpersonal and organizational resources. As task-related resources have long been considered the motivational attributes of jobs, they have also been studied the most often in the field (Morgeson & Humphrey, 2006; Oldham & Hackman, 2010; Van den Broeck et al., 2016). However, this may have led to other potential motivators in research and job design being ignored, such as social and organizational sources of motivation and well-being (Oldham & Hackman, 2010).

Despite numerous studies of work engagement, thus far, no studies have systematically studied the context/job specificity of the importance of job resources and compared the relative importance of various job resources for work engagement while at the same time controlling for

their influence on each other by partitioning the variance of work engagement into different intercorrelating resources. Therefore, we do not know the unique contribution of the concurrent and long-term determinants (job resources) of work engagement.

Based on JD-R theory and other job-based motivational theories and previous research evidence, we formulated two hypotheses:

Hypothesis 1: All job resources contribute to work engagement cross-sectionally across different jobs (Hypothesis 1a) and over time (Hypothesis 1b).

Hypothesis 2: Regardless of the job type, job resources at the level of the task contribute relatively more to work engagement than job resources at other levels: organization of a job, interpersonal and social, and organizational, both concurrently (Hypothesis 2a) and over time (Hypothesis 2b).

The present study

To test our hypotheses, we examined eight different job resources. Our choice of the predictors was guided by both theory and practical aims. As JD-R theory posits that job resources can exist at the levels of task, organization of work, interpersonal and social relations, and organizational levels, this study included resources from all these levels. Task resources included job autonomy, skill discretion and job feedback. Role clarity represented a job resource related to the organization of work. As interpersonal and social resources, we focused on friendliness and team empowerment, whereas servant leadership and justice represented organizational resources.

At the task level, the most consistently studied job resources have been job autonomy/job control, that is, being able to make decisions concerning one's job; skill discretion, that is, being able to use skills at work, be creative and learn new things at work; and job feedback, that is, seeing the results of one's accomplishments.

Role clarity, that is, knowing what is expected of oneself and not having to struggle with role ambiguity and conflicts, was the obvious choice to represent the organization of a job as a job resource. The other job resource of this type used in the JD-R literature, namely participation in decision-making, may not have been meaningful for all the employees (such as service support employees in this study).

Job resources representing interpersonal and social relations at work could be either informal and climate-related or goal-oriented and related to how the work is organized at the group level. Therefore, we chose friendliness and team empowerment to represent these two types of interpersonal resources. Friendliness concerns the extent to which an employee feels they are welcome at work, recognized as a colleague and a person, and met

with kindness. It was chosen because acts of kindness are likely to boost positive emotions, self-esteem, and confidence, and also be reciprocated among the giver and the receiver, which all in turn may increase work engagement (Hakanen et al., 2014; Schaufeli & Salanova, 2010).

Team empowerment incorporates four elements: potency, meaningfulness, autonomy, and impact (Kirkman & Rosen, 1999). Several team constructs, for example, team potency, self-management, team resilience, and teamwork, may predict work engagement. We chose team empowerment, because it is a multidimensional construct and broader than the other constructs. In addition, conceptually, empowerment (originally an individual-level concept), referring to increased task motivation resulting from an individual's positive orientation to their work role (Spreitzer, 1995), is relevant for work engagement. Although surprisingly little research exists on team empowerment and work engagement, at the team level, team empowerment has been positively related to productivity, proactivity, job satisfaction, customer service, and organizational and team commitment (Kirkman & Rosen, 1999). Therefore, we assumed that it could also be a strong driver of work engagement.

As regards organizational resources, although transformational leadership as a leadership orientation has most often been studied as a predictor of work engagement, we chose servant leadership. This is because servant leadership explicitly focuses on employees and their well-being, potentials, and growth (Mayer, 2010), and because servant leaders operate through the satisfaction of their followers' needs (Van Dierendonck et al., 2014). Servant leadership refers to a leadership mind-set and a set of practices that focus on empowering employees and their positive growth, holding them accountable for their performance, providing direction, and expressing humility, authenticity, and interpersonal acceptance (Van Dierendonck, 2011; Van Dierendonck & Nuijten, 2011). A study by Van Dierendonck et al. (2014) compared the impacts of servant leadership and transformational leadership on employee outcomes and found that although both constructs were positively related to work engagement, servant leadership was more strongly associated with it. In addition, in a recent 18-month follow-up study among Finnish public sector employees (Kaltainen & Hakanen, 2021), servant leadership predicted a decrease in burnout and an increase in work engagement which further affected positive changes in adaptive performance and task performance.

Another organizational resource in this study was *justice*, here measured as procedural practices (distributing work fairly, respect and appreciation from management, and solving conflicts in a fair way). Organizational justice has been linked to several important outcomes, such as job satisfaction and organizational commitment (Viswesvaran & Ones, 2002), positive affect (Colquitt et al., 2013), and employee health (Elovainio et al., 2010), and we expected

it to also be highly likely to contribute to work engagement across jobs.

The practical goal of the study was to help the participating 87 organizations (T1) identify their strengths in terms of job resources and employee well-being so that organizations could better target their own activities to boost employee well-being and motivation. To do this, we provided to several involved organizations a possibility to comment on the scales to be included to guarantee that they were relevant. After that we aimed to choose the types of job resources that were relevant and meaningful in all the participating organizations, and which could be measured but also developed and managed to improve performance (Luthans, 2002).

Methodologically, to gain more robust evidence for our findings, we employed heterogeneous (professions, sectors) cross-sectional data set, and separately focused on 11 specific jobs to gain a deeper and more robust understanding of the potential similarities/differences between jobs. As employees within the same organization are likely to be more similar than those in other organizations, we estimated linear mixed models, adjusted for each organization. In addition, we employed a two-wave data set which enabled us to investigate the importance of each job resource in relation to one another to work engagement over a 3-year follow-up period. The interesting question is whether some job resources gain relatively more salience over a long period of time or whether the rank order of job resources remains the same regardless of time.

Methods

Participants

The data were collected on two occasions in 2011 and 2014. At Time 1 in 2011, either an electronic or a postal survey questionnaire was sent to a total of 20,471 employees of 87 Finnish organizations that had volunteered to participate in the study, resulting in a 56.6% response rate. This sample consisted of employees from various occupations representing different industrial sectors and geographical locations in Finland. All the major sectors were represented: private, state, municipalities, church, and nongovernmental organizations (NGOs).

Of the 87 organizations participating in 2011, 28 volunteered to take part again in 2014. The organizations' large drop-out rate was largely due to organizational changes they had undergone, or other practical reasons such as their own annual job satisfaction surveys taking place simultaneously. All the employees in the 28 organizations received either an electronic or a postal survey questionnaire ($N=6,989$) and 3,912 responded, resulting in a response rate of 55% in 2014 ($N=3,912$). Of these 3,912 respondents, a total of 2,334 respondents participated at both Time 1 and Time 2, forming the two-wave panel sample. The

3-year follow-up interval was based on practical arrangements such as project funding issues, which were not influenced by the researchers.

From the cross-sectional sample collected at T1, we were able to draw employees representing 11 heterogeneous occupations ($N=5,785$) from 70 organizations. These occupations represented the largest occupational groups in the data set. We also chose the occupations because they included a sufficient number of respondents to enable statistical analyses. These occupations were doctors ($n=147$; 39.7%), nurses ($n=1,051$; 61.2%), nursing assistants ($n=863$; 43.6%), bank and insurance employees ($n=375$; 55.3%), IT employees ($n=243$; 65.7%), protection and security employees ($n=151$; 42.1%), researchers ($n=386$; 61.1%), secretaries and assistants ($n=883$; 66.4%), support service employees ($n=977$; 43.0%), museum and library employees ($n=320$; 63.6%), and supervisors and managers ($n=389$; 66.5%). They represented different levels of required education and socio-economic status.

The cross-sectional sample at T1 comprised 81.4% women (in the whole study population comprising 87 organizations, 78.4% were female), and the occupations ranged from nursing assistants (98.6% women) to protection and security employees (19.2% women). The mean age of the respondents was 46.5 ($SD=10.53$; in the study population 46.4, $SD=10.00$, respectively). The subsamples were quite representative of the study population in terms of age and gender. Of the 11 job types, only one differed significantly in terms of age (49.9; $SD=9.8$ vs. 49.1; $SD=10.8$ among supportive service employees, thus the respondents were slightly older). Similarly, one job differed in terms of gender (98.6% vs. 97.4% women among nursing assistants, thus slightly more women responded).

As regards the follow-up data, we compared the demographics and the study variables of the participants who responded to the queries at both Time 1 and Time 2 to those who had participated at Time 1 only ($N=8,239$). Women were slightly over-represented in the follow-up data, as 86.9% were women, compared to 79.53% among the nonrespondents, $\chi^2(1)=65.43$, $p<.001$. There were no significant age differences. In terms of the eight job resources measured, the mean differences were minor, varying from 0.03, $F(1)=2.79$, $p<.05$, for job feedback to 0.13, $F(1)=29.81$, $p<.001$, for team empowerment, so that participants at both times reported slightly higher levels of job resources. Nonrespondents at T2 also reported slightly less work engagement, 4.78 versus 4.87; $F(1)=13.46$, $p<.001$. Overall, due to modest differences, we assume that selective drop-out did not bias our results.

Measures

Work engagement was assessed using the 9-item version of the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). All the three subscales were measured using

three items. *Vigor* was assessed by, for example, “At my work, I feel bursting with energy” (α_{T1} and $\alpha_{T2}=.90$), *dedication* by, for example, “I am enthusiastic about my job” ($\alpha_{T1}=.91$ and $\alpha_{T2}=.93$), and *absorption* by, for example, “I feel happy when I am working intensely” ($\alpha_{T1}=.87$ and $\alpha_{T2}=.89$). In the analyses, we used the total score of work engagement (α_{T1} and $\alpha_{T2}=.95$). Items of work engagement were rated on a seven-point scale ranging from 0 (“never”) to 6 (“always”).

Job resources. Eight job resources were included in this study. *Job autonomy* was measured using three items, such as “my job allows me to make a lot of decisions on my own” from the Job Content Questionnaire (Karasek, 1979; α_{T1} and $\alpha_{T2}=.80$). *Skill discretion* was measured using four items (e.g., “my job requires that I learn new things”) also from the Job Content Questionnaire (Karasek, 1979; $\alpha_{T1}=.84$ and $\alpha_{T2}=.85$). *Job feedback* was assessed using three items (Hackman & Oldham, 1980; $\alpha_{T1}=.69$ and $\alpha_{T2}=.72$). An example item is “the work itself provides me with information about how well I am performing.” *Role clarity* was measured using two self-developed items (correlations between the items, $r_{T1}=.67$ and $r_{T2}=.72$), for example by asking, “How well are you aware of the tasks and objectives of your own work?” *Justice* (“Is work distributed fairly?”) was assessed using four items (Kristensen et al., 2005; $\alpha_{T1}=.82$ and $\alpha_{T2}=.84$). All the aforementioned job resources were measured using a 5-point scale (1 = *very rarely*, 5 = *very often*). *Friendliness* (Hakanen et al., 2014) was measured using five items (“My colleagues are friendly toward me”; $\alpha_{T1}=.88$ and $\alpha_{T2}=.90$) with a 6-point scale (1 = *rarely/never*, 6 = *always*). *Team empowerment* was assessed using eight items from Kirkman and Rosen (1999; $\alpha_{T1}=.90$ and $\alpha_{T2}=.91$), covering all four aspects of the measure: team autonomy, potency, meaningfulness, and impact. An example item is “My team determines as a team how things are done in the team.” A 7-point point scale was used (1 = *strongly disagree*, 7 = *strongly agree*). *Servant leadership* (Van Dierendonck & Nuijten, 2011) was assessed using 30 items (e.g., “My manager encourages me to use my talents”) covering eight subdimensions of servant leadership, such as empowerment, accountability, humility, and authenticity (α_{T1} and $\alpha_{T2}=.95$). A 6-point scale was used (1 = *strongly disagree*, 6 = *strongly agree*).

Statistical analyses

We employed DA to investigate the relative importance of the eight job resources for the total work engagement score in the whole cross-sectional sample, and separately in each of the 11 job types drawn from Sample 1, using linear mixed models adjusted for each organization. In addition, tests of the relative contributions of job resources at T1 to work engagement at T2 were conducted, controlling for

work engagement at T1 among those who responded to both surveys.

In the two-wave data analysis, our focus was on the effects of the various job resources on work engagement in the long term. Thus, through cross-sectional analyses, we were able to study whether certain job resources contribute more or less than other job resources to concurrent work engagement. Through two-wave analysis, in turn, we studied whether certain job resources are more or less important for work engagement in the long term.

As the interest was in determining the relative importance of each predictor in the models controlling for random effect (i.e., clustering) in the form of organization, we used the R^2 measure of level 1 derived from the procedure of Snijders and Bosker (1994). Thus, we measured the importance of the predictor in explaining the variation of the dependent variable in the cross-sectional sample, taking into account the clustering of individual participants in the organizations in which the participants were employed.

The DA statistic of interest was General dominance, which defines the relevant importance of predictors in a practically meaningful way. Unlike other DA statistics (conditional and complete), this can almost always be established (Luo & Azen, 2013). Technically, it is derived as the weighted arithmetic average of the marginal contribution to the overall fit statistic for each predictor. The overall fit statistic and contribution is derived by starting from simple models with only one predictor, all the way to models including all predictors. In our case, this statistic described the mean difference of the R^2 measure in the regression models of all sizes, including and excluding any predictor, that is, the relative importance of job resources for explaining the greater share of variation in the level of work engagement.

DA is used to overcome the methodological difficulties related to traditional regression models using several correlated predictors (Johnson, 2000). Typically, the predictors' relative importance has been compared by their standardized regression coefficients and sometimes also simply by their bivariate correlations with the outcome of interest. However, the problem with the previous methods may be that the predictors are considerably correlated with each other, which causes multicollinearity problems. A review by Courville and Thompson (2001) found that drawing conclusions regarding important or unimportant predictors on the basis of the statistical significance of standardized regression coefficients led to numerous mistakes. In the latter case comparing bivariate correlations, the importance of predictor variables may change dramatically once the intercorrelations between the predictors are taken into account (Azen & Budescu, 2003). Regression, including stepwise and hierarchical approaches with several overlapping independent variables, may overestimate the importance of the strongest predictors, underestimate the importance

of the less-important predictors, reverse the signs of the predictors (i.e., suppressor effect), and allow slight differences in interpredictor correlations to change the pattern of the derived regression weights (Behson, 2002).

In addition to overcoming multicollinearity problems, DA is particularly useful for comparative purposes when there is a large number of predictors and when the predictors collectively explain a medium or large proportion of the variance in the outcome (Azen & Budescu, 2003; Budescu, 2003). For these reasons, we considered DA to be the appropriate and easy-to-interpret method to determine the relative importance of the predictors for work engagement.

Thus far, DA has only been used occasionally in work and organizational psychology. For example, Behson (2005) compared the relative importance of informal and formal types of work–family support on various affective, intentional and behavioral outcomes and found that means of informal support explained a greater share of variance in employee outcomes such as job satisfaction. O'Brien and Allen (2007) found, using DA, that individual differences accounted for more of the variance associated with organizational citizenship behavior and counterproductive behavior than organizational attitudes. In addition, Miller et al. (2012) compared two measures of organizational justice for predicting several outcomes, for example, group commitment and helping behavior. Although quite rarely applied, DA could provide interesting theoretical and practical insights into many questions in management, business, and work and organizational psychology.

Before the dominance analyses, we calculated the intraclass correlations (ICCs) of the scales to investigate the extent to which employees working in the same organization resembled each other in terms of our study variables. The ICC provides an estimate of the proportion of the total variance in an observed variable that is due to between-group differences (Heck, 2001). The ICC coefficients had an average value of 4% (ranging from 2.8% for role clarity to 5.6% for justice) which can be considered a low to moderate grouping effect (Hox, 2002). Therefore, in the individual-level dominance analyses, we took into account the nested nature of the data using mixed-effect regression with wrapper “mixdom” in Stata's DOMIN module (Luchman, 2015). As our interest was in the relative importance of the predictors in the mixed models controlling for the clustering of the employees in different organizations, we exploited the R^2 measure of level 1, derived from the convention of Snijders and Bosker (1994) and Luo and Azen (2013) in modeling the importance of the predictor in the hierarchical models.

In addition to controlling for the impact of the organization, we included age and gender in the DA models, as the age and gender distributions varied in the different jobs in this study, and age has correlated positively with work engagement, and female employees have reported

slightly higher levels of engagement than men (Hakanen et al., 2019).

Results

Preliminary analyses

We tested the measurement model (MM) using eight job resources and work engagement to explore whether the latent variables could be distinguished from each other. The fit indices of the MM were reasonably good ($\chi^2(704)=21,969.92$, comparative fit index [CFI]=.91, incremental fit index [IFI]=.91, normed fit index [NFI]=.91, and root mean square error of approximation [RMSEA]=.056 (Browne & Cudeck, 1993; Hu & Bentler, 1999). The modification indices revealed no cross-loadings between different factors and that fit indices could have been improved by freeing the error correlations of a few indicators within their respective factor.

Table 1 shows the intercorrelations of the study variables both in the cross-sectional sample ($N=11,468$) and in the follow-up data ($N=2,334$). The intercorrelations between different job resources and the three dimensions of work engagement in the cross-sectional data set varied between .22 and .52. The intercorrelations between T1 job resources and the work engagement dimensions at T2 varied from .17 (friendliness at T1 and absorption at T2) to .41 (skill variety, job feedback, and team empowerment at T1 and dedication at T2).

Dominance analyses

Do all job resources contribute to work engagement cross-sectionally in the whole sample and across jobs? Table 2 presents the results of the cross-sectional DA (general dominance) for the total score of work engagement ($N=11,468$) as well as the results of the follow-up analysis ($N=2,334$). Cross-sectional sample explained 39% of variance in work engagement: job resources contributed 94.3% and demographics (age and gender) 5.7% to the explained variance in work engagement. All job resources contributed to work engagement at varying degrees: from 5.0% (job autonomy) to 22.9% (skill discretion) out of the all explained variance. In addition, focusing specifically on different jobs in the cross-sectional data set all job resources, albeit to different degrees, contributed to work engagement in all eleven jobs (Table 3). These results support Hypothesis 1a.

Do all job resources contribute to work engagement over time? Moreover, also over time each job resource at T1 contributed to work engagement at T2 after controlling for the impact of the covariates and baseline work engagement (Table 2). The whole model explained 41% of variance in work engagement. Baseline work engagement explained

nearly two thirds of the variance in work engagement 3 years later, while demographics contributed 1.6% and job resources at T1 one-third (33.1%) to explaining variance in work engagement at T2. Specifically, job resources at T1 contributed from 1.8% (role clarity) to job feedback (7.9%) out of all the explained variance. Thus, these findings support Hypothesis 1b that all job resources contributed to future work engagement even after controlling for work engagement at T1.

Are task-level resources more important than other types of job resources for work engagement cross-sectionally and across jobs? The DA findings in the whole cross-sectional sample at T1 ($N=11,468$) presented in Table 2 indicated that skill discretion was the most important predictor of work engagement: Of all the explained variance in work engagement, skill discretion contributed 22.9%. After this, job feedback (% $R^2=19.2\%$) and team empowerment (% $R^2=17.4\%$) contributed most to work engagement. After these three job resources, justice (% $R^2=10.3\%$) and servant leadership (% $R^2=8.2\%$) were next in the rank order. Finally, friendliness (% $R^2=5.9\%$), role clarity (% $R^2=5.5\%$), and job autonomy (% $R^2=5.0\%$) also contributed to work engagement, but clearly less so than the other job resources.

Table 3 presents the DA results from 11 different jobs ($N=5,785$) for work engagement, drawn from the whole cross-sectional sample. These job-specific results lend robust support to the previous results regarding the most important contributors to work engagement. Although there were some fluctuations in rank order between the different job resources, again skill discretion (% R^2 varied between 29.6% among the support service employees and 15.9% among the protection and security employees), job feedback (% R^2 varied between 25.6% among museum and library employees and 10.5% among doctors), and team empowerment (% R^2 varied between 25.3% among doctors and 12.4% among managers) contributed most to explaining the variance in work engagement. Skill discretion was ranked among the three most important job resources in all the 11 jobs, and as the most important job resource in five jobs. Both job feedback and team empowerment were among the three top job resources in 10 out of the 11 jobs and fourth in one job.

On average, the fourth and fifth most important contributions to work engagement were made by two organizational resources, namely servant leadership (% R^2 varied between 18.4% among doctors and 5.1% among protection and security employees) and justice (% R^2 varied between 15.0% among managers and 4.3% among doctors). Their rank order varied considerably between third (doctors, bank, and insurance employees) and eighth place (protection and security employees) for servant leadership, and between third (managers) and sixth place (doctors, bank, and insurance employees) for justice.

Table 1. Means, standard deviations, and correlations between study variables in the whole sample at T1 (N= 11,468) above the diagonal and in the 3-year follow-up data below the diagonal (N=2,334).

Variables	T1 sample		Two-wave sample		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.		
	M _{T1}	SD _{T1}	M _{T1}	SD _{T1}														M _{T2}	SD _{T2}
1. Age	46.21	10.50	45.99	9.51	49.02	9.50	-.03	.01	-.02	.09	.10	-.11	-.05	-.04	-.01	.07	.06	.09	
2. Gender	1.81	.39	1.13	.34	1.13	.34	.00	-.13	-.01	.03	.04	.07	.04	-.00	-.04	.12	.12	.13	
3. Job autonomy _{T1}	3.63	.88	3.59	.88	3.60	.86	.05	.13	.59	.35	.25	.20	.36	.35	.35	.26	.32	.25	
4. Skill discretion _{T1}	3.82	.85	3.86	.84	3.83	.84	-.01	.03	.61	.46	.29	.26	.49	.43	.42	.41	.52	.42	
5. Job feedback _{T1}	3.77	.69	3.78	.70	3.81	.70	.10	-.03	.36	.48	.45	.22	.48	.34	.36	.42	.48	.39	
6. Role clarity _{T1}	4.19	.70	4.25	.68	4.27	.70	.12	-.05	.31	.48	-.	.24	.40	.32	.32	.31	.32	.25	
7. Friendliness _{T1}	4.73	1.02	4.80	.97	4.32	1.19	-.11	-.07	.20	.26	.25	-.	.38	.32	.35	.29	.30	.22	
8. Team empowerment _{T1}	5.31	1.00	5.37	.98	5.38	.99	-.03	-.03	.40	.55	.45	.42	-.	.47	.47	.42	.47	.40	
9. Servant leadership _{T1}	4.13	.76	4.22	.74	4.28	.90	-.06	-.03	.45	.37	.35	.36	.56	-.	.62	.35	.37	.31	
10. Justice _{T1}	3.17	.81	3.24	.82	3.24	.82	.01	.02	.48	.39	.34	.39	.56	.63	-.	.38	.40	.32	
11. Vigor _{T1}	4.80	1.15	4.86	1.12	4.78	1.17	.04	-.13	.28	.43	.32	.33	.49	.39	.42	-.	.85	.72	
12. Dedication _{T1}	4.86	1.24	4.92	1.22	4.83	1.25	.04	-.12	.53	.47	.31	.34	.52	.41	.43	.85	-.	.78	
13. Absorption _{T1}	4.79	1.19	4.84	1.15	4.72	1.23	.08	-.13	.25	.41	.26	.27	.44	.35	.35	.73	.78	-.	
14. Job autonomy _{T2}							-.04	.13	.61	.45	.27	.15	.14	.27	.22	.27	.20	.25	.17
15. Skill discretion _{T2}							-.04	-.01	.46	.63	.38	.22	.25	.41	.36	.36	.35	.43	.33
16. Job feedback _{T2}							.05	-.04	.28	.37	.58	.31	.18	.37	.27	.30	.34	.37	.28
17. Role clarity _{T2}							.05	-.08	.19	.25	.34	.48	.17	.30	.25	.26	.26	.26	.21
18. Friendliness _{T2}							-.13	-.09	.18	.28	.23	.22	.49	.38	.38	.36	.28	.31	.23
19. Team empowerment _{T2}							-.07	-.03	.29	.42	.39	.30	.30	.54	.42	.41	.36	.40	.32
20. Servant leadership _{T2}							-.01	.03	.31	.38	.31	.29	.27	.40	.56	.43	.26	.27	.22
21. Justice _{T2}							.03	-.11	.22	.33	.36	.26	.25	.36	.29	.32	.62	.59	.50
22. Vigor _{T2}							.04	-.12	.27	.41	.41	.27	.26	.41	.33	.33	.60	.67	.55
23. Dedication _{T2}							.08	-.14	.21	.30	.33	.21	.17	.32	.25	.25	.51	.53	.59
24. Absorption _{T2}																			

(Continued)

Table 1. (Continued)

Variables	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
3. Job autonomy _{T1}	–										
4. Skill variety _{T1}	.37	.52	–								
5. Job feedback _{T1}	.27	.36	.49	–							
6. Role clarity _{T1}	.25	.38	.33	.32	–						
7. Friendliness _{T1}	.40	.57	.59	.50	.54	–					
8. Team empowerment _{T1}	.34	.47	.40	.36	.47	.59	–				
9. Servant leadership _{T1}	.34	.46	.41	.40	.48	.57	.67	–			
10. Justice _{T1}	.31	.46	.45	.40	.39	.52	.39	.43	–		
11. Vigor _{T1}	.35	.55	.50	.38	.38	.56	.40	.43	.87	–	
12. Dedication _{T1}	.29	.44	.41	.31	.29	.44	.35	.36	.74	.79	–
13. Absorption _{T1}											
14. Job autonomy _{T2}	–										
15. Skill variety _{T2}	.59	–									
16. Job feedback	.37	.52	–								
17. Role clarity _{T2}	.27	.36	.49	–							
18. Friendliness _{T2}	.25	.38	.33	.32	–						
19. Team empowerment _{T2}	.40	.57	.59	.50	.54	–					
20. Servant leadership _{T2}	.34	.47	.40	.36	.47	.59	–				
21. Justice _{T2}	.34	.46	.41	.40	.48	.57	.67	–			
22. Vigor _{T2}	.31	.46	.45	.40	.39	.52	.39	.43	–		
23. Dedication _{T2}	.35	.55	.50	.38	.38	.56	.40	.43	.87	–	
24. Absorption _{T2}	.29	.44	.41	.31	.29	.44	.35	.36	.74	.79	–

SD: standard deviation.

Note: Above the diagonal, correlation |.02| is statistically significant, $p < .05$; correlations |.03| is statistically significant, $p < .01$; and correlations $\geq |.04|$ are statistically significant, $p < .001$. Below the diagonal, correlations |.04–.05| are statistically significant, $p < .05$; correlations |.06–.08| are statistically significant, $p < .01$; and correlations $\geq |.09|$ are statistically significant, $p < .001$. Gender: 1 = men; 2 = women.

Table 2. Results of general dominance analyses for work engagement in the whole cross-sectional sample ($N=11,468$) and in the follow-up sample ($N=2,334$) and controlling for the organization.

Variables	Work Engagement at T1 ($N=11,468$)	Work Engagement at T2 (follow-up) ($N=2,334$)
Work engagement T1		.271 (65.2%)
Age	.006 (1.6%)	.000 (0%)
Gender	.016 (4.1%)	.008 (1.6%)
Job autonomy	.019/8 (5.0%)	.008/7 (1.9%)
Skill discretion	.089/1 (22.9%)	.022/3 (5.3%)
Job feedback	.074/2 (19.2%)	.033/1 (7.9%)
Role clarity	.021/7 (5.5%)	.007/8 (1.8%)
Friendliness	.023/6 (5.9%)	.009/6 (2.1%)
Team empowerment	.067/3 (17.4%)	.028/2 (6.8%)
Servant leadership	.032/5 (8.2%)	.014/5 (3.5%)
Justice	.040/4 (10.3%)	.016/4 (3.8%)
$R^2/\% R^2$ rank	.39 (100%)	.41 (100%)

Note: Explained variances and standardized dominance estimates (Domin = % R^2 explained) for work engagement (in parentheses)..

Finally, friendliness (% R^2 varied between 8.0% among protection and security employees and 0.2% among bank and insurance employees), role clarity (% R^2 varied between 8.6% among nursing assistants and 2.6% among bank and insurance employees) and job autonomy (% R^2 varied between 9.0% among IT employees and 4.1% among nursing assistants) contributed relatively the least to work engagement.

All in all, these results partly but consistently support our Hypothesis 2a that task-related job resources made the strongest contribution to work engagement when measured concurrently, as skill discretion and job feedback were consistently among the three most important job resources for work engagement. However, the third task-related job resource, job autonomy, contributed less than most of the other job resources in this study. In addition, a social job resource, team empowerment, was among the three most important predictors of work engagement.

Are task-level resources more important than other types of job resources for work engagement over time? The two-wave 3-year follow-up findings, for the most part, follow previous findings based on cross-sectional analyses. Again, albeit in a slightly different order, the three most important antecedents of work engagement were job feedback (% $R^2=7.9\%$), team empowerment (% $R^2=6.8\%$), and skill discretion (% $R^2=5.3\%$). The second most important cluster of job resources were organizational resources, that is, justice (% $R^2=3.8\%$) and servant leadership (3.5%), which made the fourth and fifth strongest contributions to future work engagement. After these five job resources, the third cluster in terms of contributions to work engagement at T2 were friendliness (% $R^2=2.1\%$), job autonomy (% $R^2=1.9\%$) and finally role clarity (% $R^2=1.8\%$).

Thus, compared to the cross-sectional findings, the rank order of the relative importance of job resources for future work engagement followed a strikingly similar pattern, with only a slightly different order in some job resources. Most noteworthy, job feedback at baseline was ranked as the number one predictor of work engagement (number 2 for concurrent work engagement). In addition, skill discretion, the most important job resource for concurrent work engagement in the cross-sectional sample, was ranked as the third most important job resource for future work engagement. Again, the third task-related job resource, job autonomy, made a more modest (seventh strongest) contribution to work engagement. Thus, these findings lend support to Hypothesis 2b except for one task-level resource, job autonomy. Instead, a social job resource, team empowerment, was among the three most important contributors of work engagement both concurrently and over time.

Discussion

Some scholars have called for studies testing whether, similarly to job demands, different types of job resources could be distinguished (Taris & Schaufeli, 2016) by, for example, differentiating them in terms of their energizing potential for work engagement (Hakanen & Roodt, 2010; Saks & Gruman, 2014). In this study, we hypothesized that task-related job resources are relatively more important than others (organization of job, interpersonal and social relations, and organizational) for work engagement across different jobs, both concurrently and over time. To test our hypotheses, we used DA and large cross-sectional data set ($N=11,468$), including 11 jobs representing various blue- and white-collar occupations ($N=5,785$), and two-wave data ($N=2,334$) to extend the cross-sectional findings.

Table 3. Results of complete dominance analyses for work engagement in 11 jobs at TI (N = 5,785).

Variables/job	Doctors (N = 147)	Nurses (N = 1,051)	Assistant nurses (N = 863)	Bank and insurance employees (N = 375)	IT employees (N = 243)	Protection and security employees (N = 151)	Researchers (N = 386)	Secretaries and assistants (N = 883)	Support service employees (N = 977)	Museum and library employees (N = 320)	Managers (N = 389)
Age	.009 (2.0%)	.007 (2.8%)	.014 (4.6%)	.055 (12.9%)	.030 (5.9%)	.003 (0.6%)	.002 (0.5%)	.009 (2.2%)	.015 (4.1%)	.001 (0.4%)	.004 (0.9%)
Gender	.012 (2.8%)	.003 (1.0%)	.001 (0.2%)	.020 (4.8%)	.001 (0.6%)	.001 (0.1%)	.015 (3.2%)	.005 (1.1%)	.005 (1.4%)	.001 (0.2%)	.013 (2.9%)
Job autonomy	.030/5 (6.8%)	.019/7 (7.0%)	.012/8 (3.8%)	.034/5 (7.9%)	.045/5 (9.0%)	.034/6 (6.7%)	.027/7 (5.8%)	.023/7 (5.5%)	.015/8 (4.1%)	.026/8 (6.3%)	.026/8 (5.6%)
Skill discretion	.106/2 (24.0%)	.049/3 (18.4%)	.094/1 (29.5%)	.103/1 (24.3%)	.097/2 (19.2%)	.082/3 (15.9%)	.089/2 (19.3%)	.094/1 (22.4%)	.107/1 (29.6%)	.104/2 (25.2%)	.126/1 (26.9%)
Job feedback	.047/4 (10.5%)	.051/1 (19.4%)	.046/2 (14.5%)	.049/4 (11.7%)	.095/3 (18.8%)	.124/1 (24.2%)	.111/1 (23.9%)	.078/3 (18.6%)	.054/3 (14.8%)	.105/1 (25.6%)	.074/2 (15.9%)
Role clarity	.016/7 (3.6%)	.011/8 (4.3%)	.027/6 (8.6%)	.012/7 (2.6%)	.017/8 (3.4%)	.033/7 (6.5%)	.035/5 (7.5%)	.012/8 (2.8%)	.017/7 (4.8%)	.028/6 (6.8%)	.038/5 (8.0%)
Friendliness	.011/8 (2.4%)	.019/6 (7.0%)	.013/7 (4.2%)	.001/8 (0.2%)	.022/7 (4.3%)	.041/5 (8.0%)	.026/8 (5.6%)	.025/6 (5.9%)	.025/6 (6.9%)	.028/7 (6.7%)	.032/6 (6.7%)
Team empowerment	.112/1 (25.3%)	.051/2 (19.3%)	.044/3 (13.7%)	.071/2 (16.8%)	.098/1 (19.4%)	.111/2 (21.6%)	.072/3 (15.6%)	.080/2 (19.2%)	.066/2 (18.3%)	.053/3 (13.0%)	.058/4 (12.4%)
Servant leadership	.081/3 (18.4%)	.031/4 (11.7%)	.030/5 (9.5%)	.050/3 (11.9%)	.036/6 (7.1%)	.026/8 (5.1%)	.031/6 (6.8%)	.056/4 (13.4%)	.025/5 (6.9%)	.031/5 (7.6%)	.027/7 (5.7%)
Justice	.019/6 (4.3%)	.025/5 (9.3%)	.036/4 (11.4%)	.031/6 (7.3%)	.063/4 (12.5%)	.058/4 (11.4%)	.055/4 (11.8%)	.038/5 (9.1%)	.033/4 (9.1%)	.034/4 (8.2%)	.070/3 (15.0%)
R ² /% R ² rank	.44 (100%)	.27 (100%)	.32 (100%)	.42 (100%)	.51 (100%)	.51 (100%)	.46 (100%)	.42 (100%)	.36 (100%)	.41 (100%)	.47 (100%)

IT: information technology.

Note: Explained variances and relative contribution (in parentheses) of each variable.

According to our study, of the task resources, being able to use a range of skills; having opportunities to learn new things and be creative at work (skill discretion); and knowing the results of one’s work activities and the meaning and purpose of one’s job in a larger context (job feedback), are highly engaging qualities at work. Skill discretion was the top job resource for concurrent work engagement in the large heterogenous cross-sectional sample, as well as for many specific jobs. Job feedback, in turn, made the strongest contribution to future work engagement and was also among the top job resources for work engagement in many jobs. Instead, the third task resource, job autonomy, clearly contributed less to work engagement, as its rank position across jobs varied between fifth to eighth place out of the eight predictors.

Skill discretion and job feedback are included as core job characteristics in JCT—which proposes that these resources increase work motivation and job satisfaction (Hackman & Oldham, 1980). As the opposite to work engagement, a recent study (Harju & Hakanen, 2016) found that work tasks that did not enable employees to fully activate themselves to employ their capabilities and invest themselves in their work were related to missing opportunities for professional growth and learning. This, in turn, led to disengagement and boredom at work. Skill discretion implies that employees are more likely to experience their jobs as challenging, interesting, and growth-promoting instead of routinized and lacking opportunities to fully use one’s capabilities.

Similarly, as job feedback provides information on one’s activities, it builds a sense of meaningfulness (Hackman & Oldham, 1980) as well as a sense of accomplishment and competence, which are all important ingredients for engagement in work. It may be that being able to see the immediate positive contributions one makes at work also builds long-term purpose, which then effectively enhances and sustains work engagement. A recent cross-sectional study of more than 28,000 employees from 30 European countries comparing permanent, fixed-term, and temporary agency employees also found that in every contract group, out of five job resources (including job control, supervisor and colleague support, and positive social climate), job feedback made the strongest contribution to work engagement (Hakanen et al., 2019). Unfortunately, job feedback was the only job resource in common with our study. Our results suggest that job feedback is one of the key drivers of work engagement in both the short and the long term.

Our finding that job autonomy may not be as important for work engagement as some other job resources may sound counterintuitive, as job autonomy is one of the key characteristics in many work-stress models and theories (e.g., Karasek, 1979). It is also one of the job resources most often included in surveys using JD-R theory. Job autonomy and skill discretion have traditionally been

combined and studied as one construct (Karasek, 1979). Our study supports the view that they should be distinguished when studying the drivers of work engagement.

Interestingly, a study focusing on the differential associations of job autonomy and skill discretion with the opposite of work engagement, job burnout, found that skill discretion was, as expected, negatively and job autonomy nonsignificantly related to burnout (Rafferty et al., 2001). In addition, a study covering several sectors found that job autonomy was less strongly associated with work engagement than skill variety, feedback, and social support (Van den Broeck et al., 2017). Moreover, a recent study (Stiglbauer & Kovacs, 2018) supported the vitamin model (Warr, 1987) and indicated that too much job autonomy may sometimes be even harmful for employee well-being.

Perhaps the changing nature of work, for example, flexible temporal and spatial work arrangements and the switch toward team-based work has meant that autonomy today often means “tied autonomy”: individual freedom to make decisions and plan one’s work but also a high level of interdependency and shared structures of time and demands (Väänänen & Toivanen, 2018). This complexity of experiencing job autonomy: self-directed working but also restricting time-bound and social expectations and structures, may limit the actual possibilities to perform one’s work autonomously. Therefore, job autonomy may not fulfill the basic need of autonomy, doing things out of volition (Deci et al., 2017). As a result, the engaging power of job autonomy may be more limited in today’s often knowledge-based jobs, than it used to be during the industrial era when autonomy had clearer structures and scope. In the future, one option could be to pay closer attention to different types of autonomy (e.g., time control and method control) to find the most engaging aspects of autonomy.

The importance of team empowerment as a driver of work engagement, as suggested by our study, may also reflect changes in the way work is organized toward socially embedded jobs and self-directed teams. To our knowledge, only one study has investigated team empowerment as an antecedent of work engagement (Kirrane et al., 2019). Team empowerment provides a supportive and energizing environment for employees: being part of an efficacious and competent team, having a meaningful job, being able to make a difference as a team, and belonging to a team with autonomy and self-directedness, are all engaging characteristics in employees’ social work contexts. The results of this study suggest that it may be more engaging to work in a team that has autonomy—rather than individual decision authority—at least as long as the team is perceived to also have the other aforementioned empowering qualities. Already for a long time, in many organizations, the basic unit of the structure of work has been the team rather than the individual (Devine et al., 1999). Therefore, future research on work engagement could benefit from taking the social context into better account in its designs.

In their meta-analysis of work design literature, Humphrey et al. (2007) recommended using several jobs to investigate the relationships between work characteristics and outcomes. Many studies typically include only one or a very limited number of jobs, and this restriction in range within studies may reduce the observed correlations between work characteristics and outcomes, producing lower estimates of population correlations. In this study, similarly to heterogeneous cross-sectional and two-wave follow-up samples, the comparison between 11 jobs, the three job resources, skill discretion, job feedback, and team empowerment, made the strongest contributions to work engagement in most jobs. Servant leadership, justice, friendliness, job autonomy, and role clarity were in relative terms more important in some jobs but clearly less so in others. For example, servant leadership made a strong contribution to work engagement among doctors and nurses but a much weaker one among supervisors and managers.

Although earlier ignored in studies using JD-R theory, several studies have now indicated a positive relationship between effective leadership (e.g., transformational leadership and servant leadership) and work engagement (e.g., Breevaart et al., 2014; De Clercq et al., 2014; Tims et al., 2011). However, work engagement refers to the relationship between the employee and their work and thus the closer to the employee the job resource is, the more likely it is to be engaging. Therefore, in relative terms, most jobs obviously have more relevant job resources for work engagement than leadership. In addition, we measured a multidimensional construct of servant leadership (Van Dierendonck & Nuijten, 2011), and it is obvious that some dimensions of servant leadership, such as empowerment and stewardship, have stronger engaging potential than others, for example, forgiveness and courage.

Theoretical and methodological implications

Earlier motivational theories of work (Hackman & Oldham, 1980; Herzberg et al., 1959) assumed that work characteristics that are close to the content of the job, that is, task characteristics, are the major predictors of employee well-being and motivation. Instead, JD-R theory posits that job resources at any level (task, organization of the job, interpersonal and social relations, and organizational) can be important (Bakker & Demerouti, 2017; Schaufeli & Taris, 2014). JD-R theory and earlier motivational theories such as JCT (Hackman & Oldham, 1980) and the two-factor model (Herzberg et al., 1959) mainly differ in their treatment of job resources. While JD-R theory is more comprehensive and general, it is also less specific regarding the relevance of any job resource for work engagement. Earlier theories are more specific, but therefore also more limited in scope. Our study aimed to bridge the gap between these literatures.

JD-R theory’s strength is its flexibility, but at the same time, it may be difficult to choose a priori the most important job resources to be included in a survey or to be

targeted via interventions. For instance, job autonomy is the job resource most often studied as a motivational work characteristic (Van den Broeck et al., 2016) and yet our study suggests that it may not be as important as some other job resources. In addition, often in previous studies that have used JD-R theory, the selection of the job resources (and demands) has been based on previous studies in a similar context, which may not be the most promising direction to follow.

Our findings partly supported the assumption regarding the importance of task resources (particularly skill discretion and job feedback) and partly the more general assumption of JD-R theory regarding the importance of job resources beyond task characteristics (particularly team empowerment). It is of note that all the other job resources also contributed both cross-sectionally and over time to work engagement, as posited by JD-R theory, although to a lesser extent. However, our findings suggest that in the future, a refined JD-R theory could include more detailed predictions of the importance of different job resources, and we hope that this study has provided some insights for this.

Our study was only on the individual level, but in line with this suggestion, a theoretical paper by Bakker and Demerouti (2018) suggests including job resources at multilevel to gain a better understanding of the importance of the various resources. In addition, since JD-R theory proposes that job resources may also decrease burnout (e.g., Bakker et al., 2005), an interesting future step would be to investigate whether the same job resources are as important in facilitating work engagement as in preventing burnout. We believe that our study may inspire refinements of JD-R theory to become more specific in its predictions.

Methodologically, our findings were based on DA, which has not often been used in work and organizational psychology. Generally, in approaches to multiple regressions, one can distinguish between model selection, that is, an explanatory approach and a prediction approach. The former approach aims to test and compare a theoretical model with theoretically chosen variables and is much more widely used than the latter. The prediction approach, in turn, attempts to find the best-predictive model by appropriately partitioning variance to the various predictors to define their relative importance for the outcome. It is also less concerned about whether the specific variables included in such a model are the true predictors (Azen & Budescu, 2003).

Therefore, as DA is often considered an inductive approach, it also provides methodological possibilities to respond to the call for high-quality inductive research to serve as the basis for future theory (Spector et al., 2014). Future research could benefit from using DA when the aim is to compare different predictors and identify the most important ones for the outcomes of interest.

In addition to DA, another under-utilized methodological approach is artificial neural networks (ANNs). ANN

allows testing complex nonlinear relationships by focusing on interconnections in the predictors and their relative importance (e.g., Karanika-Murray & Cox, 2010; Somers et al., 2021). Compared to traditional ordinary least squares (OLS) regression, ANN provides a more comprehensive understanding of various constellations of predictor variables and thereby helps to build more accurate predictive models of employee well-being (e.g., Somers et al., 2021). We suggest that scholars would consider these alternative possibilities in testing models to find novel theoretical insights that could also have high practical value for organizations.

Practical implications

Predictive modeling, such as this study, may be particularly useful for practice and for assessing the distance between theory and practice (Shmueli, 2010). Practically, our study suggests that certain job resources provide promising options for redesigning more engaging work. Organizations may enhance the most important resources by using various top-down job design means to improve task contents and interactions at work (Hackman & Oldham, 1980) and by building and supporting self-directed, empowering teams (Kirkman & Rosen, 1999).

Increasing skill discretion by, for example, job enrichment, and organizing and supporting work groups to become more autonomous and potent and thereby also provide a more meaningful and impactful context for working, is likely to lead to more work-engaged employees across different jobs and industries. Interventions focusing on options for job feedback and developing leadership and fair practices can also result in more work engagement. Instead, our results suggest that improving role clarity, increasing job autonomy and training in interpersonal skills, for example, friendliness and consideration, may have more limited power to boost work engagement.

In addition to top-down interventions, organizations may encourage employee-initiated bottom-up proactive behaviors, such as job crafting (Bakker, 2017; Wrzesniewski & Dutton, 2001). For instance, skill discretion could be increased by learning new skills to obtain more inspiring tasks or by seeking new challenges. Employees could also receive more immediate feedback on their performance through cognitive job crafting, that is, by better understanding the value of their work and accomplishments or by social job crafting, for example, asking their colleagues for feedback. Team empowerment could be improved through job crafting by individually seeking new social resources or by collaborative job crafting (Leana et al., 2009).

In addition, a recent meta-analysis and utility analysis (Oprea et al., 2019) divided job crafting interventions into those that only included individual objectives and those that focused on both individual and organizational objectives. It

found that the combined interventions were superior to those that focused on only individual needs. The combined approach could be used to include elements to simultaneously increase the task and organizational resources available for employees. For example, collaborative interventions with supervisors and managers could also include goals related to improving leadership practices.

Limitations

This study has several limitations. First, although in addition to cross-sectional data, we could employ two-wave data, we cannot claim to have established causality between the predictors and the outcome. To do that, we would have needed to have at least three measurement points which is considered a prerequisite for a longitudinal study (Ployhart & Vandenberg, 2010).

Second, as our cross-sectional findings may have limited generalizability, we also replicated the cross-sectional analyses in another heterogeneous sample consisting of those employees in 28 organizations who did not participate in the study at T1 but participated at T2 ($N=1,578$). The findings, which can be requested upon the first author, were highly similar in this sample thus lending further support to our findings.

Third, although we covered eight possible predictors of work engagement, it seems that we could have included many more. The qualitative review of JD-R studies by Schaufeli and Taris (2014) refers to 31 different job resources and 12 personal resources (and 30 job demands) that have been studied using JD-R theory. However, having such a number of different predictors in one questionnaire is not practically possible. Instead, we aimed to choose job resources that would represent, in a versatile way, the potential drivers of work engagement that could be increased in various jobs and industries. We also included no job demands. It would have been interesting to study the relative importance of challenge (assumably positive impact) and hindrance (negative impact) demands for work engagement. Future studies could dig deeper into comparing the relative contributions of different job demands and personal resources to work engagement.

Fourth, this study covered 11 different types of jobs, but many more exist. Moreover, there may be cultural differences between the key drivers of work engagement. It would be highly interesting to study the relative importance of various job resources among, for example, workers in platforms or employees from different countries.

Fifth, our sample mainly consisted of female employees (81.4%). However, as the data set was large, in absolute numbers, we had more than 1,000 male respondents ($N=1,076$). Future studies could have a more balanced ratio of women and men to examine the relative importance of the different drivers of work engagement.

Sixth and finally, this study cannot explain why certain job resources were to some extent more important in some jobs compared to others. The statistical procedure we used in this study, DA, aims to identify the most important predictors of the relevant outcome, and for this purpose DA seems superior to traditional multiple regression analyses when the predictors correlate (Tonidandel & LeBreton, 2011). Future research could pay more attention to the determinants of various job resources and the mechanisms linking specific job resources to work engagement in different jobs and contexts.

Final note

After nearly 20 years of research in many occupations, organizations, and countries, work engagement is known to be beneficial both for employees and organizations. By using large cross-sectional and 3-year follow-up data sets from many organizations, this study systematically compared the relative importance of different antecedents of work engagement, that is, eight job resources for work engagement, while also controlling for their impacts on each other. Generally, despite some fluctuations in the relative importance of the various predictors in the different samples, two task-related job resources—skill discretion and job feedback—and one interpersonal job resource—team empowerment—emerged as the most important drivers of work engagement. Other types of job resources and one task-related job resource—job autonomy—clearly contributed less. These results contribute to JD-R theory by making more specific predictions regarding the key drivers of work engagement. This information can be used in planning interventions to boost work engagement.

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