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# Are job and personal resources associated with work ability 10 years later? The mediating role of work engagement

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Using a two-wave 10-year longitudinal design, this study examined the motivational process proposed by the Job Demands-Resources (JD-R) model. The aim was to examine whether work engagement acts as a mediator between job resources (i.e. supervisory relations, interpersonal relations and task resources) and personal resources (self-esteem) on the one hand and future work ability (i.e. a worker's functional ability to do their job) on the other. The second aim was to investigate the mediating role of engagement between past work ability and future work ability. Structural equation modelling was used to test the mediation hypotheses among Finnish firefighters ($N = 403$). As hypothesized, engagement at T2 fully mediated the impact of job and personal resources at T1 on work ability at T2. In addition, the effect of work ability at T1 on work ability at T2 was partially mediated by engagement at T2. These results indicate that job and personal resources may have long-term effects on engagement, and consequently on work ability, thus expanding on the propositions of the JD-R model. The results show a dual role of work ability, as a health-related resource that may foster engagement and an outcome driven by the motivational process proposed by the JD-R model.

Keywords: engagement; job resources; personal resources; self-esteem; work ability; firefighters; longitudinal

## Introduction

The well-established Job Demands-Resources (JD-R) model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) assumes that work characteristics, such as job demands and job resources, have either positive or negative effects on employee well-being. The basic assumption of the JD-R model is that two distinct psychological processes — the health-impairment process and the motivational process — are differently related to well-being. Firstly, the health-impairment process assumes that job demands lead to burnout, and consequently to ill-health. Secondly, the motivational process assumes

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that job resources lead to work engagement, which, in turn, has a positive effect on organizational outcomes. According to the later formulations of the JD-R model, personal resources, such as self-esteem, may have similar motivational potential to that of job resources (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). However, one limitation of the JD-R model has been its neglect to elucidate the relationship between job and personal resources and health-related outcomes. Nevertheless, the motivational process initiated by job and personal resources, through engagement, may also lead to positive health-related outcomes (e.g. Hakanen & Roodt, 2010), such as work ability.

Work ability refers to workers' ability to carry out their work, that is, having the occupational competence, the health required for the job and the occupational virtues that are required for managing the work tasks (Tengland, 2011). Thus, work ability refers to functional capacity to meet the requirements of the job. So far, work ability research has not studied the motivational aspects of human resources with the same intensity as it has biographical and life-style factors (e.g. age, alcohol consumption, physical exercise, BMI) and work-related factors (e.g. mental and physical work demands, management) (for a review, see Van den Berg, Elders, Zwart, & Burdorf, 2009), despite the fact that affective-motivational factors such as work engagement are considered essential factors related to work ability (e.g. Ilmarinen, 2009). To conclude, it is not yet clear what the relationships are between engagement and work ability, and between self-esteem and work ability; and the long-term impacts that both job and personal resources may have on work ability via engagement.

Therefore, in the present study, using the Conservation of Resources (COR) theory (Hobfoll, 1989), the Broaden-and-Build (BaB) theory (Fredrickson, 2001) and self-enhancement theory (Jones, 1973) as theoretical frameworks, we examined the motivational properties of job and personal resources in the JD-R model in a sample of Finnish firefighters. Based on those theories, we argue that both job and personal resources are significantly related to future work engagement, and consequently, to work ability. More specifically, we examined whether work engagement acts as a mediator between job resources and self-esteem (a personal resource) on the one hand, and work ability on the other. In addition, we examined whether work engagement mediates the effect of past work ability on future work ability. Thus, we investigated the dual role of work ability in the motivational process as proposed in the JD-R model. More particularly, we studied the role of work ability as a health-related outcome of the motivational process, and simultaneously its role as a health-related resource that may boost work engagement and consequently predict not only directly but also indirectly future work ability across a 10-year follow-up period.

## Job resources and work engagement in the JD-R model

The basic assumption of the JD-R model is that job resources are positively related to work engagement, which, in turn, is related to positive outcomes, thus constituting a motivational process (Bakker & Demerouti, 2007). As such, job resources refer to those physical, psychological, social or organizational aspects of the job that may help to achieve work goals, reduce job demands and the related physiological and psychological costs, and stimulate personal growth and development (Demerouti et al., 2001). Additionally, work engagement refers to an affective-motivational state of work-related

well-being that is characterized by vigour, dedication and absorption (Schaufeli, Salanova, González-Roma, & Bakker, 2002).

In the current study among firefighters, we included three job resources that prior studies have identified as important resources for this professional group: (1) *supervisory support* (e.g. Haslam & Mallon, 2003; Mitani, Fujita, Nakata, & Shirakawa, 2006); (2) *supportive interpersonal relations* (e.g. Saijo, Ueno, & Hashimoto, 2007); and (3) *task resources* (e.g. Lusa, Punakallio, Luukkonen, & Louhevaara, 2006). Self-Determination Theory (SDT; Deci & Ryan, 2000; Van den Broeck, Vansteenkiste, de Witte, & Lens, 2008) offers a plausible explanation for the choice of the three selected job resources. According to SDT, intrinsic motivation will flourish if three basic psychological needs — autonomy, competence and relatedness — are satisfied. For firefighters, autonomy may be related to their ability to make decisions concerning their work tasks (i.e. task resources); competence may be related to their opportunities to use their skills at work (i.e. task resources); and social support from colleagues and supervisors to the relatedness need of SDT (i.e. supervisory support and interpersonal relations), all of which are consistently shown to be related to work engagement (e.g. Hakanen & Roodt, 2010; Van den Broeck et al., 2008).

COR theory (Hobfoll, 1989) describes pathways from job resources to employee health. Firstly, the basic tenet of the resource-oriented COR theory is that people strive to retain, protect and build resources that they value. Moreover, these resources, such as conditions (i.e. job resources) or personal characteristics (i.e. self-esteem) are salient in gaining new resources and in enhancing health. More precisely, those with greater resources are less vulnerable to stress, and additionally they are more capable of future resource gain, and consequently will have better protection against ill-health. To summarize, the COR theory, alongside the JD-R model, assumes that high levels of resources can be beneficial for health (and work ability) in the long term.

Empirically, the motivational process of the JD-R model, leading from job resources through engagement to positive organizational outcomes, has been convincingly supported (for an overview, see Schaufeli & Taris, 2014). For example, organizational outcomes such as customer loyalty (Salanova, Agut, & Peiró, 2005), organizational commitment (Hakanen, Schaufeli, & Ahola, 2008) and innovativeness (Hakanen, Perhoniemi, & Toppinen-Tanner, 2008) have been examined. In contrast, the link between job resources via work engagement to *health-related* outcomes, such as work ability, has rarely been investigated. Nevertheless, based on the COR theory we assume that job resources may also be positively related to health-related outcomes via engagement. In fact, some evidence exists on the positive association between job resources and/or engagement and health-related outcomes (e.g. Hakanen & Schaufeli, 2012; Parzefall & Hakanen, 2010). Additional evidence corroborates the positive relations between work engagement and health (e.g. Langelaan, Bakker, Schaufeli, van Rhenen, & van Doornen, 2006; Seppälä et al., 2012) and between work engagement and work ability (e.g. Airila, Hakanen, Punakallio, Lusa, & Luukkonen, 2012; Hakanen, Bakker, & Schaufeli, 2006).

In addition, previous studies have shown a long-term impact of resources on well-being, thus supporting the assumption of COR theory of a slow accumulation process resulting in long-term resource gains. For example, a study among the Finnish working population (Hakanen, Bakker, & Jokisaari, 2011) showed that skill variety (a job resource) negatively predicted burnout 13 years later, even after controlling for the concurrent levels of skill variety. In addition, a study among Dutch employees showed

that various job and personal resources were positively related to work engagement over a follow-up period of 18 months (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Similarly, Hakanen, Peeters, and Perhoniemi (2011) found that various job resources predicted both work engagement and work-family enrichment over a three-year follow-up period, further supporting the notion of long-term resource gain processes. Taken together, these findings suggest that the motivational process proposed by the JD-R model may also lead to better health — although the primary health outcomes may often follow the health-impairment pathway. Therefore, based on theoretical reasoning as well as earlier empirical findings, we formulate the following hypothesis:

*Hypothesis 1:* Job resources at T1 will be positively related to work ability at T2 through work engagement at T2. In other words, work engagement will mediate the relationship between job resources and future work ability.

### Personal resources in the JD-R model

A more recent formulation of the JD-R model proposes that personal resources may have similar motivational potential to that of job resources and may be positively related to work engagement, and consequently to positive work-related outcomes (Xanthopoulou et al., 2007). By definition, personal resources are positive self-evaluations that are linked to resilience, and refer to an individual's sense of ability to successfully control and impact on his or her environment (Hobfoll, Johnson, Ennis, & Jackson, 2003). In the current study, we included self-esteem as a typical personal resource that may be beneficial for achieving positive work-related outcomes (e.g. Hobfoll, 2001). Self-esteem refers to a positive evaluation of one's worth, significance and ability as a person (Janssen, Schaufeli, & Houkes, 1999; Rosenberg, 1965). According to Hobfoll (2001), self-esteem can be viewed as a personal characteristic that is valued in its own right. Indeed, self-esteem — as a personal resource — may play an important role in human functioning in two ways.

First, COR theory (Hobfoll, 1989) proposes that personal resources (e.g. self-esteem) tend to generate other resources, which, in their turn, may result in better well-being. More precisely, according to COR theory, the loss or gain of self-esteem results in stress or well-being, respectively. In a similar vein, Rosenberg, Schooler, Schoenbach, and Rosenberg (1995) have emphasized the value of global self-esteem as a predictor of (psychological) well-being. Secondly, self-enhancement theory (Jones, 1973; see also Rosenberg et al., 1995) provides a theoretical explanation for the underlying mechanism that links self-esteem to health-related outcomes. According to this theory, people strive to protect and enhance their feelings of self-worth (i.e. self-esteem). This maintenance of self-esteem leads to self-protective motives, and thus to the beneficial development of well-being. Therefore, based on these theories we assume that self-esteem — as a personal resource — is an antecedent of work engagement (i.e. work-related well-being), and consequently related to work ability.

Indeed, some evidence exists of the positive relationship between self-esteem and well-being (for a review, see Baumeister, Campbell, Krueger, & Vohs, 2003). For example, in their 10-year longitudinal study of university students, Salmela-Aro and Nurmi (2007) found that self-esteem predicted work engagement, thereby suggesting that resource gain processes can take place over a long time period. Research findings also show that high self-esteem may protect from burnout (Alarcon, Eschleman, & Bowling,

2009; Janssen et al., 1999; Kalimo, Pahkin, Mutanen, & Toppinen-Tanner, 2003). Together these studies suggest that a high level of self-esteem helps employees to cope successfully with stressors at work, and consequently, may lead to better health and well-being. Tellingly, to our knowledge, the link between self-esteem and *work ability* has not yet been examined, despite the fact that COR theory and self-enhancement theory provide a plausible theoretical framework for explaining the relationship between these variables. Thus, based on these three approaches, it can be assumed that employees who see themselves as worthy, significant and able as a person may also be more willing to put effort into their work tasks, and become fully involved in their work. As a result, their work ability will also be better than that of employees with lower levels of self-esteem. Therefore, we formulate the following hypothesis:

*Hypothesis 2:* Self-esteem at T1 will be positively related to work ability at T2 through work engagement at T2. In other words, work engagement will mediate the relationship between self-esteem and future work ability.

## Work ability as a health-related resource in the JD-R model

Traditionally, in the JD-R model health-related indicators are considered to be outcomes of the health-impairment process. However, health-related outcomes may themselves be important resources that boost work engagement and consequently further improve health and well-being. In fact, The World Health Organization (WHO) defines health as a positive concept including physical, mental and social well-being, that is, "a resource for everyday life" rather than the objective of living (WHO, 1986). Thus, health can be conceptualized as a kind of capital in which individuals may invest in order to achieve positive future health outcomes (Williamson & Carr, 2009). In a similar vein, it can be argued that work ability is a health-related resource that is likely to be related to future well-being.

The Broaden-and-Build (BaB) theory of positive emotions (Fredrickson, 2001) provides a possible theoretical explanation for the mechanism that links work engagement and work ability. According to this theory, positive emotions broaden peoples' thought-action repertoires, build their enduring personal resources and consequently lead to better well-being (see also Ouweneel, Le Blanc, Schaufeli, & Van Wijhe, 2012). Thus, based on the build hypotheses of the BaB theory, work engagement can be assumed to build health-related resources, such as work ability. In addition, and in line with COR theory, BaB theory proposes that emotions and well-being affect each other reciprocally (i.e. gain or upward spirals), supporting the assumption of mutually positive relationships between work ability and work engagement.

Empirically, there is convincing evidence supporting the role of work ability as a resource that may have beneficial effects on well-being and other health-related variables also in the long term. For example, Seitsamo et al. (2011) showed that work ability was a strong predictor of later-life health in a 28-year longitudinal study among Finnish municipal workers. Similarly, Ahlstrom, Grimby-Ekman, Hagberg, and Dellve (2010) found that work ability predicted future health among women working in human service organizations. Feldt, Hyvönen, Mäkikangas, Kinnunen, and Kokko (2009) in their turn showed that work ability of Finnish managers was related to job involvement and organizational commitment — both constructs that are closely related to work engagement.

Thus, based on BaB theory and on earlier research findings, we argue that work ability can be viewed as a health-related resource that fosters a high level of positive energy (vigour), strong identification (dedication) and strong focus (absorption) on one's work. Hence, we assume that good work ability is likely to influence work engagement, which, in its turn, may improve future work ability. Thus, we formulate our next hypothesis:

*Hypothesis 3*: Work ability at T1 will be positively related to work engagement at T2, which in its turn will be positively related to subsequent work ability at T2. In other words, work engagement will partially mediate the impact of work ability at T1 on work ability at T2.

The research model is graphically illustrated in Figure 1.

## Method

### Procedure and participants

The data is part of a questionnaire study among Finnish firefighters conducted in 1996, 1999 and 2009. In this study, we use the data from 1999 and in 2009 which include the variables of interest in the present study. The 10-year interval between data collections was determined by practical decisions and financial arrangements that the researchers could not influence. This long time interval offered the possibility to study the effect of the slow process of personal resource accumulation. In 1999, 1124 questionnaires were posted, and 72% ($n$ = 794) were returned. At follow-up 10 years later, 68% ($n$ = 721) returned the questionnaire. The research process is reported in detail elsewhere (Lusa et al., 2006; Lusa, Punakallio, & Luukkonen, 2011).
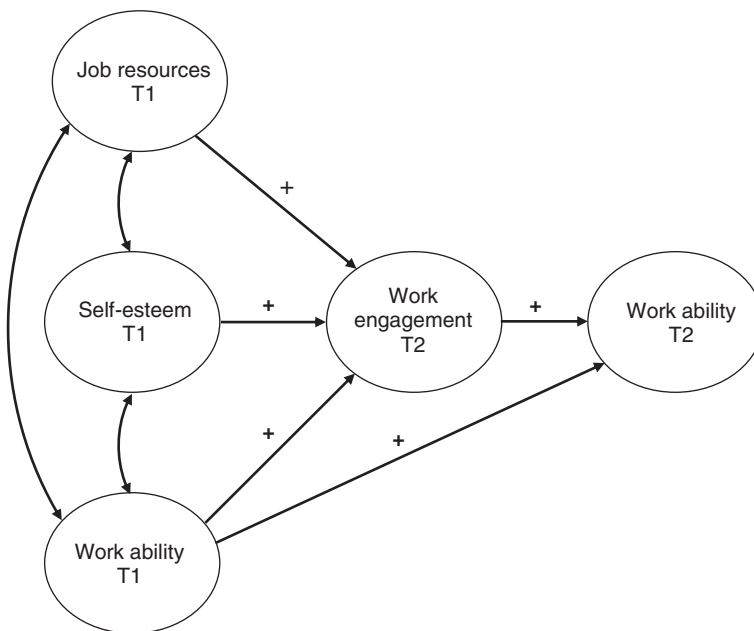


Figure 1. The theoretical model.

The study population of the current research consisted of professional operational firefighters who responded to the questionnaires in both 1999 (T1) and 2009 (T2), and were still employed in their profession ($N = 403$). All participants were men. At T2, the average age of the study population was 48.5 (range 35–62, $SD = 5.4$). The large majority (88%, $n = 315$) had firefighter qualifications, 29% ($n = 105$) had a sub-officer qualification and 10% ($n = 35$) had a fire chief qualification. Mean work experience in fire and rescue services was 25.3 years (range 3–39, $SD = 5.8$). Finally, at T2, 2% ($n = 9$) were not participating in operative tasks.

Of the respondents from 1999, 148 dropped out and did not participate in the study in 2009. Two-sample *t*-tests indicated that the dropouts were slightly older (mean age 39.9 vs. 38.5 years), had lower education (primary school education 29% vs. 18%) and had poorer work ability (mean score 7.5 vs. 8.1, score range 0–10) than those who responded at both times. By contrast, two-sample Wilcoxon tests revealed that the dropouts and the participants did *not* significantly differ in relation to self-esteem (mean value 34.85 vs. 34.31; score range 10–40), supervisory relations (mean value 3.78 vs. 3.73), interpersonal relations (mean value 3.95 vs. 3.97) or task resources (mean value 3.19 vs. 3.05; all three ranges 1–5).

## Measurements

*Job resources.* The three job resources at T1 — supervisory relations, interpersonal relations and task resources — were adapted from the Occupational Stress Questionnaire, which is well validated in Finland (Elo, Leppänen, Lindström, & Ropponen, 1992). *Supervisory relations* included five items covering supervisory support, supervisory control and relationships between employees and supervisors. An example item is "Do you get support and help from your supervisor when needed?". *Interpersonal relations* consisted of four items: conflicts between employees, conflicts between younger and older workers, cooperation in one's work-unit and relationships between employees. An example item is "Do conflicts between employees affect your work?". *Task resources* included three items: decision making on issues concerning one's tasks, opportunities to use one's knowledge and skills at work and feedback on success in work tasks. An example item is "Can you use your knowledge and skills at work?". All job resource items were rated on a five-point scale ranging from 1 (*not at all/practically never*) to 5 (*very much*). A high score indicates a perception of supportive and co-operative supervision, positive interaction and co-operation between co-workers, task autonomy, opportunities for skill utilization and feedback.

*Self-esteem.* Self-esteem at T1 was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965) consisting of 10 items. Rosenberg's self-report scale is one of the most widely used measures of self-esteem (Marsh, 1996). It includes both positive (e.g. "On the whole, I am satisfied with myself") and negative (e.g. "At times I think I am no good at all") items. All items were rated on a four-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

*Work engagement.* Work engagement at T2 was measured by the short version of the Utrecht Work Engagement Scale, UWES (Schaufeli, Bakker, & Salanova, 2006), consisting of nine items, with three sub-scales: vigour (e.g. "At my work, I feel bursting with energy"), dedication (e.g. "My job inspires me") and absorption (e.g. "I am immersed in my work"). Each of the dimensions was assessed using three items. The items were rated on a seven-point frequency-based scale ranging from 0 (*never*) to 6 (*daily*).

*Work ability.* Work ability at T1 and T2 was measured by one question with a scale from 0 to 10: "Assume that your work ability at its best has had a value of 10. How many points would you give your current work ability? (0 means that currently you cannot work at all)". This single-item question was derived from the Work Ability Index (WAI) questionnaire (Tuomi, Ilmarinen, Jahkola, Katajarinne, & Tulkki, 1998), a valid measure of work ability (van den Berg et al., 2009). Prior studies have indicated a strong association between the total WAI-score and the single-item indicator (e.g. Ahlstrom et al., 2010). In addition, both the total WAI and the single-item question have shown similar patterns of associations with diverse health-related outcomes (e.g. Ahlstrom et al., 2010). Thus, a single-item question of work ability is a good alternative to the rather complex measure of total WAI-index, and has been widely used in Finnish work life and health surveys (e.g. Kauppinen et al., 2010).

Score ranges for all variables are given in Table 1.

### Data analysis

To test our hypotheses, we used structural equation modelling (SEM) techniques with maximum likelihood (ML) estimation and the AMOS 18.0 software package (Arbuckle, 2009). After testing the measurement model, we tested five different structural equation models. These were, firstly, the *hypothesized mediation model* (M1) in which work engagement fully mediates the relationships between job resources and self-esteem at T1 and work ability at T2, and partially mediates the relationship between work ability at T1 and work ability at T2; secondly, the *partial mediation model* (M2) which includes both the indirect (via engagement) and direct relationships between job resources and self-esteem at T1 and work ability at T2; thirdly, the *direct model* (M3) in which both job resources and self-esteem at T1 relate to work ability at T2 without the mediating role of work engagement, and work engagement relates to work ability at T2. In the fourth model, the *alternative direct model* (M4), job resources, self-esteem and work ability at T1 simultaneously relate to work engagement at T2 and work ability at T2. Thus, M4 includes three variables from T1 and two parallel outcomes at T2, and no mediators. Fifthly and finally, we tested *the alternative model* (M5) in which work ability at T1 is not related to work engagement, whereas the relationships between job resources and self-esteem at T1, and work ability at T2 are fully mediated by work engagement. Thus, this model was similar to the M1 except for removing the link between work ability at T1 and work engagement at T2.

The latent job resources variable was indicated by supervisory relations, interpersonal relations and task resources. After conducting an exploratory factor analysis, two scales

Table 1.  Means, standard deviations and correlations between the study variables ($N = 403$).

| Variables | Range | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Self-rated work ability T1 | 0–10 | 8.06 | 1.23 | – | | | | | | | |
| 2. Supervisory relations T1 | 1–5 | 3.78 | .78 | .15* | (.80) | | | | | | |
| 3. Interpersonal relations T1 | 1–5 | 3.95 | .77 | .10* | .49** | (.72) | | | | | |
| 4. Task resources T1 | 1–5 | 3.19 | .66 | .08 | .48** | .18** | (.68) | | | | |
| 5. Self-esteem T1 | 10–40 | 34.85 | 3.98 | .19** | .23** | .16** | .26** | (.81) | | | |
| 6. Vigour T2 | 0–6 | 3.90 | 1.48 | .19** | .24** | .19** | .27** | .21** | (.89) | | |
| 7. Dedication T2 | 0–6 | 3.98 | 1.51 | .17** | .18** | .17** | .26** | .23** | .90** | (.90) | |
| 8. Absorption T2 | 0–6 | 3.30 | 1.58 | .08 | .16** | .16** | .23** | .12* | .78** | .81** | (.90) |
| 9. Self-rated work ability T2 | 0–10 | 7.13 | 1.71 | .33** | .18** | .05 | .12* | .20** | .33** | .31** | .25** |

Note: Cronbach's alphas are on the diagonal in parentheses.
*$p < .05$; **$p < .01$.

based on positive and negative items measuring self-esteem emerged, and they were used as indicators of the latent self-esteem factor. Work engagement was indicated by vigour, dedication and absorption scales. Work ability was based on a single-item indicator.

Model fit was evaluated using goodness-of-fit indices and conventional rules of thumb for their cut-offs. To test our hypotheses, we used the Chi-square ($\chi^2$) test for goodness-of-fit, and compared the means of the chi-square difference test of different models. In addition, we examined the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI). For RMSEA, values below .05 are indicative of a good fit, below .08 a satisfactory fit and values greater than .1 should lead to model rejection (Browne & Cudeck, 1993). For CFI and TLI, values greater than .90 indicate a good fit (Byrne, 2010). In addition, to compare the different models (M1 vs. M4), we used Akeike's Information Criterion (AIC). For AIC, smaller values represent a better model fit.

Finally, we performed a bootstrap on 2000 subsamples from the original data using the ML estimator with bias-corrected 95% confidence intervals for each of the parameter bootstrap estimates to test whether the pathways between the independent variables and the outcome variable via the mediator did, in fact, represent significant mediated relationships (see e.g. Hayes, 2009).

## Results

### *Descriptive statistics*

The means, standard deviations and correlations of the study variables are presented in Table 1. All correlations between the study variables were positive and therefore in the expected direction.

### *Measurement model*

Before testing the hypothesized structural model, we estimated the so-called measurement model for all observed and unobserved variables simultaneously. The measurement model tests the measurement assumptions, relating the observed variables of the structural equation model to the latent factors while latent variables of the model are treated as common factors with no constraints on the correlations among the factors (Mulaik & James, 1995). Table 2 shows that the measurement model (MM) produced an acceptable fit to the data. The value of RMSEA fell below the limit of .08, whereas CFI and TLI exceeded the criterion of .90. All factor loadings of the latent variables exceeded the conventional minimum of .40, and the modification indices (MIs) did not indicate any cross-loadings or other needs for re-specifications in the model.

### *Testing the hypothesized model*

Table 2 shows the fit indices and chi-square difference tests of the five models that were tested. The hypothesized mediation model (M1) fitted well to the data and significantly better than the direct effects model (M3) in which job resources and self-esteem at T1 only directly predicted work ability at T2 ($\Delta\chi^2 = 35.66$, $df = 1$, $p < .001$). However, there was no statistically significant difference between the hypothesized M1 and the partial mediation model (M2) in which job resources and self-esteem at T1 both directly, and

Table 2. Fit statistics for the study models and structural model comparison ($N$ = 403).

| Model | Description | $\chi^2$ | $df$ | CFI | TLI | RMSEA | AIC | Model comparisons | $\Delta\chi^2$ | $\Delta df$ |
|---|---|---|---|---|---|---|---|---|---|---|
| MM | Measurement model | 71.91 | 27 | .97 | .94 | .064 | 147.91 | | | |
| M1 | Hypothesized mediation model | 76.33 | 29 | .97 | .94 | .064 | 148.33 | | | |
| M2 | Partial mediation model | 71.91 | 27 | .97 | .94 | .064 | 147.91 | M1 vs. M2 | 4.42 ns | 2 |
| M3 | Direct effects model | 111.99 | 30 | .95 | .90 | .082 | 181.99 | M1 vs. M3 | 35.66*** | 1 |
| M4 | Alternative direct effects model | 94.92 | 28 | .96 | .91 | .077 | 168.92 | M1 vs. M4 | 18.59*** | 1 |
| M5 | Alternative model | 80.97 | 30 | .97 | .94 | .065 | 150.97 | M1 vs. M5 | 4.64* | 1 |

Notes: $\chi^2$ = chi-square; $df$ = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; AIC = Akaike's Information Criterion; $\Delta\chi^2$ = chi-square difference; $\Delta df$ = degrees of freedom difference.
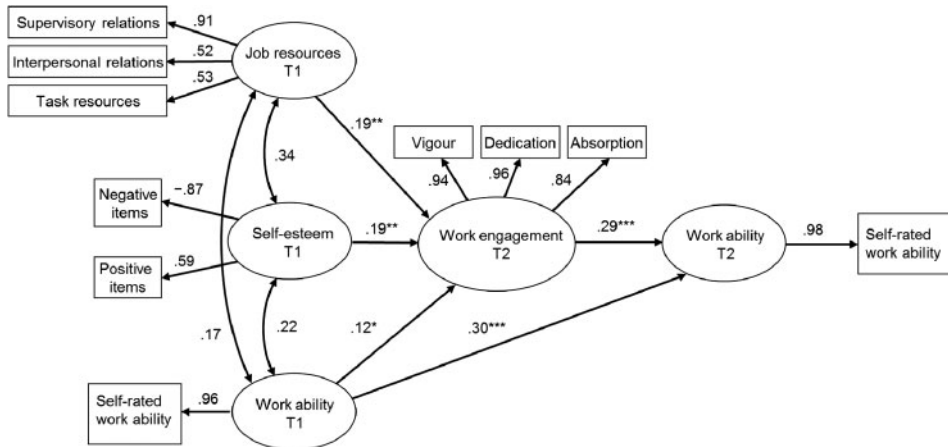*$p < .05$; ***$p < .001$.

Figure 2.   Final model of the mediating role of work engagement between job resources, self-esteem and work ability ($N = 403$). The circles represent unobserved latent factors (e.g. work ability), and squares observed variables (e.g. self-rated work ability).
Note: ***$p < .001$; **$p < .01$; *$p < .05$.

indirectly via engagement, predicted work ability at T2 ($\chi^2 = 4.42$, $\Delta df = 2$; ns). Since M2 did not improve the model fit compared with M1, the more parsimonious M1 was considered the better model.

To compare M1 with the competing non-nested and non-mediated M4 in which job resources, self-esteem and work ability at T1 only directly predicted both engagement and work ability at T2, we used Akaike's Information Criterion (AIC). AIC was larger for M4 (AIC = 168.92), thus representing a better fit for M1 (AIC = 148.33). Finally, we tested M1 against a similar model (M5), but without the path from work ability at T1 to engagement at T2. M1 fitted significantly better to the data than M5 ($\chi^2 = 4.64$, $\Delta df = 1$; $p < .05$), thus indicating the robustness of our finding that engagement partially mediates the impact of work ability at T1 on work ability at T2.

In the best-fitting model, M1 (see Figure 2), both job resources at T1 ($\beta = .19$, $p < .01$) and self-esteem at T1 ($\beta = .19$, $p < .01$) were positively related to work engagement at T2. Furthermore, work engagement at T2 was positively related to work ability at T2 ($\beta = .29$, $p < .001$). Work ability at T1 also predicted work ability at T2 10 years later ($\beta = .30$, $p < .001$), as well as work engagement at T2 ($\beta = .12$, $p < .05$). The hypothesized model explained 12% of the variance in work engagement at T2 and 21% of the variance in work ability at T2.

Finally, we used bootstrapping to test whether job resources, self-esteem and work ability at T1 yielded an indirect effect via work engagement on work ability at T2. Table 3 shows that all indirect effects were confirmed, thus supporting the mediating role of work engagement between the three T1 predictors (job resources, self-esteem and work ability) and work ability at T2.

Taken together, Hypotheses 1 and 2 on the mediating role of work engagement between job resources and work ability, and between self-esteem and work ability, respectively, were supported. In addition, Hypotheses 3 regarding the partial mediation of work engagement was also supported, as work ability at T1 had an indirect effect on work ability at T2, via work engagement.

Table 3.  Indirect pathways using bootstrapping.

| | Bootstrapping | | BC 95% CI | | |
| --- | --- | --- | --- | --- | --- |
| | Estimate | *SE* | Lower | Upper | *p* |
| *Indirect effect x → m → y* | | | | | |
| Job resources → work engagement → work ability T2 | .062 | .027 | .018 | .127 | .001 |
| Self-esteem → work engagement → work ability T2 | .056 | .027 | .014 | .124 | .010 |
| Work ability T1 → work engagement → work ability T2 | .036 | .019 | .004 | .081 | .037 |

Note: Standardized coefficients. *SE* = standard error; BC = bias corrected; CI = confidence interval.

## Discussion

The purpose of this study was to expand on previous studies on job and personal resources, work engagement and work ability within the Job Demands-Resources framework and using COR theory (Hobfoll, 1989, 2001), BaB theory (Fredrickson, 2001) and self-enhancement theory (Jones, 1973) as additional conceptual frameworks. More specifically, the impact of various kinds of resources (i.e. job, personal and health-related resources) on future work ability via work engagement was studied and all our study hypotheses were supported.

By using a 10-year longitudinal design, our results contribute to the literature in at least three ways. First, we found that work engagement fully mediated the relationship between job resources and self-esteem on work ability 10 years later, thus expanding the potential outcomes of the motivational process included in the JD-R model (Hypotheses 1 and 2, respectively). Second, our findings showed that work engagement and work ability were positively associated. This finding contributes significantly to the work ability literature, which has mainly focused on individual lifestyle- and work-related risk factors, and so far ignored the importance of motivational factors in explaining work ability (Ilmarinen, 2009). Third, our results show that work ability may be an important health-related resource itself, as it predicts work engagement 10 years later, which, in its turn, is positively associated with concurrent work ability (Hypothesis 3). The current study is one of the first on work ability that focuses not only on the antecedents of work ability but also on the positive consequences it may have (see also Feldt et al., 2009).

### Job and personal resources and work ability

Our study showed that job and personal resources (self-esteem) may lead not only to positive organizational outcomes, such as better job performance (Salanova et al., 2005) and organizational commitment (Hakanen, Schaufeli et al., 2008), but also to improved work ability. Job resources had motivational potential as they were related to future work engagement, and consequently to work ability. Thus, jobs characterized by supportive conditions such as autonomous tasks, positive interactions between co-workers and support and positive feedback from one's supervisor, may foster flourishing and engaged employees who enjoy good work ability. These results support SDT (Deci & Ryan, 2000), which highlights the importance of social-contextual conditions that either enhance or hinder motivation at work. In our study, we measured task resources (autonomy, skill variety and feedback) and social resources (interpersonal and supervisory relations). Autonomy was related to participants' ability to exert control over their tasks; competence

was related to their opportunities to use their skills and feedback; and supervisory relations and interpersonal relations were related to the relatedness need of the SDT, all of which are related to work engagement.

In addition, our results indicated that self-esteem as a personal resource plays a significant role in shaping work engagement, and via engagement also work ability in the long term, even when the impacts of baseline work ability and job resources are controlled for. In other words, the way in which people evaluate themselves affects how engaged they are, and how they assess their work ability. Thus, if a worker has a favourable attitude towards himself, considers himself worthy and respects himself, he is more likely to be enthusiastic about his work, and is more willing to put his energy into work than a colleague with low self-esteem. Moreover, he also has better work ability than his co-worker who evaluates himself or his job more negatively. As such, our results are consistent with the basic assumption of the JD-R model that highlights the relationships between personal resources, work engagement and positive work-related outcomes. In a similar vein, our results support the self-enhancement theory (Jones, 1973) that highlights the importance of self-esteem as a personal resource in promoting well-being. Our results tentatively support the COR theory's assumption of *resources caravans* (Hobfoll, 2001), that is, increasing resources (i.e. job resources and self-esteem) tend to generate new resources (i.e. work engagement and work ability), and thus form resource caravans.

### The mediating role of work engagement between resources and work ability

Following the BaB theory of positive emotions (Fredrickson, 2001), we also examined the mediating role of work engagement between job and personal resources, and future work ability. It appeared, as expected, that the effects of job resources and self-esteem on work ability 10 years later were fully mediated by work engagement after controlling for baseline work ability. More specifically, increases in job resources and self-esteem at T1 were related to an increase in work engagement at T2, which, in its turn, was positively related to work ability at T2. In addition, it is noteworthy that work ability at T1 predicted work ability at T2 not only directly but also indirectly, via work engagement. Thus, our results show that work ability can be considered a health-related resource that may have beneficial effects on employee well-being also in the long term. More precisely, employees' work ability may function as a health-related resource that builds engagement, which, in its turn, may affect work ability positively, thus supporting BaB theory. It was not possible in the present study to directly test the positive gain cycle hypothesis between work engagement and work ability as suggested by both BaB theory and COR theory because work engagement was not measured at both time points (see also Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010). However, our results suggest the possibility of such positive reciprocal relationships.

### Limitations

Our study has some limitations that should be noted. First, it was based on self-report measures, which may cause systematic measurement errors (common method variance). However, we conducted Harman's single factor test as suggested by Podsakoff, MacKenzie, Lee, and Podsakoff (2003). The test showed that common method variance

did not pose a problem because the one-factor solution did not account for the majority of the covariance among the measures. Moreover, the longitudinal design used in the current study may diminish the risk of common method bias (Doty & Glick, 1998). Nevertheless, future research would benefit from applying more objective indicators of job resources, and particularly of work ability.

Second, as we only studied job and personal resources at T1 and work engagement at T2, no causal relationship between, for example, work engagement and work ability could be determined. However, as the competing model, in which work engagement and work ability at T2 were parallel dependent variables, fitted less well than the hypothesized model, we may conclude that our model with work engagement as a mediator is a plausible one. Nevertheless, future research should investigate the effect of (and possible reciprocal relationships between) work engagement on work ability, as well as a full panel design including job and personal resources measured at all study points.

Third, the 10-year time lag used in our study may not be optimal for testing the model, as other processes such as organizational changes may have influenced the effect of independent variables on the outcomes. In general, such long time lags may lead to an underestimation of the true causal relationship between study variables (Zapf, Dormann, & Frese, 1996). However, despite the changes in the organizational structure in Finnish fire departments, the work environments and colleagues for the most part remained the same. Related to the third limitation, the effect sizes were small, albeit significant. However, the significant relationships between the study variables even over the 10-year time lag are, in fact, indicative of the robustness of the findings. In addition, even relatively small effect sizes may be salient in predicting health and well-being of employees (Ford, Woolridge, Vipanchi, Kakar, & Strahan, 2014). Nevertheless, in future studies, the research model should be tested using a shorter time lag, a full panel design and with a larger sample size, as suggested by Ford et al. (2014).

Fourth, the rather high number of dropouts may be considered a limitation. However, the differences between participants and dropouts were either non-significant or minimal. In addition, it can be expected that for the most part dropout was due to retirement because of the low retirement age among Finnish firefighters (i.e. 55 years). A stepwise increase in actual retirement age has only recently occurred in Finland; however, early retirement schemes and personal retirement arrangements (under 55 years of age) are still possible routes for retirement. Therefore, the dropout from the sample can be regarded as normal and not causing any particular bias to the results.

Finally, our study focused on only one profession: firefighters. Although some caution is needed in interpreting our results, we believe that they can be extended to other occupational sectors. First, similar evidence exists of the positive impact of work engagement on various occupational sectors and countries (e.g. Hakanen et al., 2006). Second, as job and personal resources positively affected work ability via work engagement even in a highly physically demanding job, i.e. firefighting, we assume that the same effects are also likely to be found in other occupational sectors. However, this remains to be tested.

## Conclusions

Our 10-year longitudinal study showed the existence of a health-related mechanism in the motivational process of the JD-R model. Both job resources and personal resources were

related to future work engagement, which, in its turn was related to work ability. Moreover, we found that work engagement partially mediated the effect of baseline work ability on work ability 10 years later. As such, our findings contribute to the work ability literature, which has mostly neglected its motivational aspects. Our results indicate that work engagement, supported by resourceful jobs and positive self-esteem, plays an important role in maintaining and promoting work ability, and consequently, possibly also in decreasing employees' intentions towards early retirement.

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