



Weekly work engagement and performance: A study among starting teachers

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This study among 54 Dutch teachers tested a model of weekly work engagement. On the basis of theories about the motivational potential of job resources, we predicted that teachers' weekly job resources are positively related to their week-levels of work engagement, and that week-level work engagement is predictive of week-level performance. In addition, we hypothesized that momentary work engagement has a positive, lagged effect on next week's job resources. Teachers were asked to fill in a weekly questionnaire every Friday during 5 consecutive weeks. Results of multi-level analyses largely confirmed our hypotheses, by showing that week-levels of autonomy, exchange with the supervisor, and opportunities for development (but not social support) were positively related to weekly engagement, which, in turn, was positively related to weekly job performance. Moreover, momentary work engagement was positively related to job resources in the subsequent week. These findings show how intra-individual variability in employees' experiences at work can explain weekly job performance.

Engagement is important for organizations since it contributes to the bottom line (Demerouti & Cropanzano, in press). For example, recent studies have shown that work engagement is positively related to in-role and extra-role performance (Halbesleben & Wheeler, 2008; Schaufeli, Taris, & Bakker, 2006), business unit performance (Harter, Schmidt, & Hayes, 2002), and client satisfaction (Salanova, Agut, & Peiró, 2005). Although between-person differences in performance have been the focus of traditional models, within-person variability in performance is substantial and meaningful (Deadrick, Bennett, & Russell, 1997; Fisher & Noble, 2004). The present study among teachers expands previous research by investigating how job resources facilitate engagement and performance – *on a weekly basis*. Since employees are active creators of their own work environment (e.g. Wrzesniewski & Dutton, 2001), we will also examine the reversed causal relationship between job resources and work engagement.

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Whereas previous research has shown that enduring differences in job resources can explain inter-individual differences in work engagement and performance, the present study takes this research in a new direction by testing whether persons encountering more week-specific job resources will experience higher levels of week-specific work engagement, and perform better during those weeks. This approach may explain why even engaged employees have weeks during which they perform poorly (see also Sonnentag, Dormann, & Demerouti, in press).

Work engagement

A recent review of Macey and Schneider (2008) documented the proliferation of various definitions of engagement. In the present study, we follow Schaufeli and Bakker's (2004, in press) conceptualization since it is a well-validated and the most often used approach (Bakker, Schaufeli, Leiter, & Taris, 2008). Accordingly, work engagement is a positive, fulfilling, and work-related state of mind that is characterized by vigour, dedication, and absorption. Vigour is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties. Dedication refers to being strongly involved in one's work, and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Finally, absorption is characterized by being fully concentrated and happily engrossed in one's work, whereby time passes quickly (Schaufeli & Bakker, in press; see also May, Gilson, & Harter, 2004). Recent studies have shown that engagement can be discriminated from related concepts like job embeddedness (Halbesleben & Wheeler, 2008), workaholism (Schaufeli *et al.*, 2006), and organizational commitment (Hallberg & Schaufeli, 2006).

Research has generally conceptualized work engagement as a relatively stable variable because of the continued presence of specific job and organizational characteristics (Macey & Schneider, 2008). Nevertheless, it can be assumed that there are short-term (i.e. daily or weekly) fluctuations in the experience of work engagement within one person. Experience sampling studies and diary studies have indeed shown that within-individual variations in work engagement do exist (e.g. Sonnentag, 2003). In other words, work engagement does not only differ between individuals but also shows within-person variability over time. To capture these fluctuations in work engagement, we use the diary study method in the present study. We expect that weekly variations in job resources will be related to weekly variations in work engagement.

Motivational potential of job resources

Job resources refer to those physical, social, or organizational aspects of the job that may: (1) reduce job demands and the associated physiological and psychological costs, (2) be functional in achieving work goals, or (3) stimulate personal growth, learning, and development (Bakker & Demerouti, 2008). What we call job resources has been recognized by Kahn (1990) as characteristics of work situations that shape the degree to which people employ and express themselves physically, cognitively and emotionally during role performance. In a similar vein, Hackman and Oldham (1980) refer to specific job characteristics with motivational potential. Such job characteristics foster so-called critical psychological states (e.g. meaningfulness), which - in their turn - drive people's attitudes and behaviours. Examples of job resources are autonomy, supervisory coaching, and opportunities for development.

Job resources either play an intrinsic motivational role because they foster employees' growth, learning and development, or they play an extrinsic motivational role because they are instrumental in achieving work goals. In the former case, job resources fulfil basic human needs, such as the needs for autonomy, relatedness and competence (Deci & Ryan, 1985; Ryan & Frederick, 1997). For instance, proper feedback fosters learning, thereby increasing job competence, whereas decision latitude and social support satisfy the need for autonomy and the need to belong, respectively (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008).

Job resources may also play an extrinsic motivational role, because work environments that offer many resources foster the willingness to dedicate one's efforts and abilities to the work task (Meijman & Mulder, 1998). In such environments, it is likely that the task will be completed successfully and that the work goal will be attained. For instance, supportive colleagues and performance feedback increase the likelihood of being successful in achieving one's work goals. In either case, be it through the satisfaction of basic needs or through the achievement of work goals, the outcome is positive and engagement is likely to occur (Bakker & Demerouti, 2008).

Previous between-person studies have consistently shown that job resources such as social support from co-workers and superiors, performance feedback, autonomy, and opportunities for professional development are positively associated with work engagement (for a meta-analysis, see Halbesleben, in press). For example, in their study among four different occupational groups, Schaufeli and Bakker (2004) found evidence for a positive relationship between three job resources (performance feedback, social support, and supervisory coaching) and work engagement (vigour, dedication, and absorption). More specifically, they used structural equation modelling to show that job resources (*not* job demands) exclusively predicted engagement, and that engagement is a mediator of the relationship between job resources and turnover intentions. This study was replicated in a sample of over 2,000 Finnish teachers (Hakanen, Bakker, & Schaufeli, 2006). Results of the latter study showed that job control, information, supervisory support, innovative climate and social climate were all positively related to work engagement. Conceptually similar findings were reported by Llorens, Schaufeli, Bakker, and Salanova (2007) in a Spanish context.

Weekly job resources and engagement

Between-person studies cannot explain why even engaged employees have their off-days. Every working day, employees may use their job resources to reach their work-related goals (Clegg & Spencer, 2007; Daniels, 2006; Totterdell, Wood, & Wall, 2006), for example, educating students regarding a specific topic in the case of teachers. On some days, teachers may have several job resources available, including support from colleagues, appreciation from students, and feedback from the school principal. According to the job demands-resources model, such resources will help in coping with the emotional demands of teaching, and will impact upon teachers' day-level of engagement (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007). On other days, these resources may be lacking, for instance because colleagues and the school principal are too occupied with their own work.

Previous diary studies have indeed shown that job characteristics may vary from day-to-day (Butler, Grzywacz, Bass, & Linney, 2005), and determine our daily mood or affect (Zohar, Tzischinski, & Epstein, 2003). Xanthopoulou, Bakker, Heuven, Demerouti, and Schaufeli (2008) investigated whether daily social support fosters day-levels of work

engagement among flight attendants flying to three intercontinental destinations. The social support built up with the new crew during the outbound flight turned out to foster individual employees' sense of self-efficacy during the inbound flight, as well as their levels of work engagement. In another study among fast-food restaurant employees, Xanthopoulou, Bakker, Demerouti, and Schaufeli (2009) found that daily work engagement was a function of daily changes in supervisor support, social support from colleagues and team cohesion. On the basis of this overview, we formulated our first hypothesis:

Hypothesis 1: Weekly job resources (autonomy, social support, performance feedback, supervisory coaching, and learning opportunities) are positively related to weekly work engagement.

Weekly work engagement and performance

Beal *et al.* (2005) provide a theoretical basis for examining the impact of state engagement on state performance. In contrast to traditional performance models that regard within-person differences as error variance, their *performance episodes* model focuses on an individual's variability in performance over short periods of time. Their main argument is that individuals perform better when fully concentrated on the task at hand. Specifically, Beal *et al.* (2005) propose that resource allocation to the task is crucial for successful performance. If employees cannot allocate all of their resources to the task at hand, for example, because they are constantly interrupted by telephone calls, they cannot perform optimally. Thus, replenishing and conserving (self-regulatory) resources is critical for successful performance during performance episodes and during a day.

Although not examining small performance episodes, in the present study, we concentrate on within-person performance during the workweek. We predict that this performance will be contingent on that week's work engagement (see also Xanthopoulou *et al.*, in press). There are at least two reasons why individuals high in engagement during a certain week may perform better during that week.

First, engaged employees often experience *positive emotions*, including happiness, joy, interest, and enthusiasm (Schaufeli & Van Rhenen, 2006). According to Fredrickson's (2001) broaden-and-build theory, these positive emotions have the capacity to broaden people's momentary thought-action repertoires and to build their personal resources (e.g. social relationships, self-efficacy) through widening the array of thoughts and actions that come to mind (Fredrickson & Branigan, 2005; Isen, 2000; see also Wrzesniewski & Dutton, 2001). In their study among managers, Fredrickson and Losada (2005) showed that high (vs. moderate and low) performers expressed the highest ratio of positive to negative emotions during business meetings, and were most flexible in terms of asking questions to others (inquiry) and presenting their own views (advocacy).

Second, the emotions experienced by those high in work engagement are high in *arousal or activation* (Langelaan, Bakker, Schaufeli, & Van Doornen, 2006). Researchers have conceptualized affect and emotions as a function of two orthogonal axes, pleasure, and activation (Russell & Carroll, 1999). The pleasure axis summarizes at the level of subjective experience how well one is feeling, whereas the orthogonal activation axis refers to a sense of mobilization of energy. Negative affect (NA) and positive affect (PA) can be described using these two axes whereby NA is characterized by feelings like anger, fear, nervousness, and subjective stress (Watson, 2000).

Conversely, PA is characterized by feelings like enthusiasm, energy, and happiness. Engaged employees are characterized by high PA and to a somewhat lesser degree by low NA (Schaufeli *et al.*, 2001). The high arousal, positively valenced emotions may spark engaged employees into action (cf. Damen, 2007; Lazarus, 1991). On the basis of this literature, we formulated our second hypothesis.

Hypothesis 2: Week-level work engagement is positively related to week-level performance.

The combination of *Hypotheses 1* and *2* suggests that work engagement mediates the relationship between job resources and performance. We thus formulated a third hypothesis:

Hypothesis 3: Weekly work engagement mediates the relationship between week-levels of (a) autonomy, (b) social support, (c) performance feedback, (d) supervisory coaching, (e) learning opportunities, and weekly performance.

Conservation of job resources

We also predict that engaged workers are better able to create their own job resources than those low in engagement (Clegg & Spencer, 2007). This is consistent with Hobfoll's (1989, 2002) claim that because resources are valued either in their own right or because they enable the acquisition or preservation of other valued resources, people are motivated to create resources. Once resources are obtained, people are motivated to protect them. Moreover, research with the broaden-and-build theory has shown that momentary experiences of positive emotions can build enduring psychological resources and trigger upward spirals towards emotional well-being. Thus, positive emotions not only make people feel good at the moment, but also feel good in the future (Fredrickson & Joiner, 2002).

There is indeed some evidence from between-person studies for an upward spiral of engagement and resources. Llorens *et al.* (2007) investigated task-related resources (time control and method control), self-efficacy, and engagement among students, and found that engaged students were more efficacious and better able to mobilize their resources over time. Xanthopoulou (2007) showed in her research among highly skilled technicians that T1 job and personal resources resulted in higher levels of work engagement one year later (T2). Simultaneously, work engagement resulted in more personal resources (optimism, self-efficacy, and organization-based self-esteem) and more job resources (social support from colleagues, autonomy, coaching, and feedback) over time. Conceptually similar findings were reported by Salanova, Bakker, and Llorens (2006), who tested the upward spiral among Spanish teachers. The teachers who were intrinsically motivated and enjoyed their work reported more job resources 1 year later. On the basis of this overview, we formulated our final hypothesis:

Hypothesis 4: Momentary work engagement has a positive, lagged effect on next week's levels of job resources.

Method

Procedure and participants

A weekly questionnaire was distributed among six different teacher training colleges in The Netherlands. A total of 115 teachers who had just started teaching at primary

schools were asked to participate in the study. The teachers worked on average 4 days per week, and came every Friday to their training college for further education. Participants were kindly requested to fill in the questionnaire every Friday during the 5 weeks of the study and to return it in a stamped envelope to the researchers. Each week, the second author sent the participants an e-mail to remind them of the questionnaire. Anonymity and confidentiality of the data was emphasized. A total of 54 respondents filled in and returned the weekly questionnaire (response rate = 47%). The sample size indicates sufficient power to test our hypotheses; the total number of data points is $5 \times 54 = 270$. The sample included 49 female (91%) and 5 male teachers (9%). The males did not differ significantly from females on all model variables. Respondents' mean age was 22 years ($SD = 1.60$).

We decided to use time lags of 1 week since the starting teachers who participated in our study came every Friday to their training college. Participants' work lives were clearly lived during the weeks; weekends formed the natural breaks. Therefore, it seemed useful to study resources, engagement and performance on a weekly basis (Van Eerde, Holman, & Totterdell, 2005). Research has indeed shown that individuals can perceive and report on their well-being on a weekly basis (Totterdell *et al.*, 2006), and previous studies have indicated that people are generally accurate in their judgments of affect over the course of a week (Parkinson, Briner, Reynolds, & Totterdell, 1995).

Measures

We used validated scales to measure our model variables, but all the original items were converted to the week that participants looked back upon. Short scales were used to assess each of the variables to ensure a reasonable response rate.

Job resources

In the current study, we included autonomy, social support, performance feedback, supervisory coaching, and learning opportunities because these job resources are relevant for teachers (e.g. Hakonen *et al.*, 2006). The *autonomy* (three items) and *feedback* (two items) scales were based on the Job Content Questionnaire scale of Karasek (1985) and included items such as: 'Last week, I was able to decide myself how to execute my work' (autonomy), and 'Last week, I received sufficient information about the quality of my performance' (feedback). *Social support* (three items) was based on Van Veldhoven, De Jonge, Broersen, Kompier, and Meijman's (2002) scale and included three items, e.g. 'Last week, my colleagues helped me with my tasks'. *Supervisory coaching* (three items) was measured with a Dutch adaptation of Graen and Uhl-Bien (1995) Leader-Member Exchange Scale, including the item: 'Last week, my supervisor used his/her influence to help me with problems at work'. Finally, *opportunities for development* were assessed by three items developed by Bakker, Demerouti, and Schaufeli (2003), e.g. 'Last week, my work offered me the opportunity to learn new things'.

Work engagement was measured using the nine-item version of the Utrecht Work Engagement Scale (Schaufeli, Bakker, and Salanova, 2006). The three dimensions vigour, dedication, and absorption were each measured with three items that could be scored on a seven-point scale (0 = no, that is not correct; 6 = yes, that is correct). All items were adjusted such that they referred to the previous week. Examples are: 'Last week, at work, I felt bursting with energy', and 'Last week, I was enthusiastic about my work'.

Performance was assessed using four items, including two in-role and two extra-role performance items from the scale developed by Goodman and Svyantek (1999). The items could be scored on a five-point scale (1 = totally disagree; 5 = totally agree), e.g. 'Last week, I fulfilled all the requirements of my job' (in-role performance), and 'Last week I volunteered to do things not formally required by the job' (extra-role performance). To validate our performance measure, in the first week, we also asked teachers' daily supervisors at their school to judge teachers' performance using an identical measure. Supervisor-ratings of performance correlated significantly with teacher self-ratings, $r = .46, p < .001$. This strengthens our confidence that teachers' self-ratings of performance are rooted in reality.

Analyses

The study provided data at the 'person level' (e.g. gender and age), as well as at the 'week level' (e.g. autonomy and dedication). The week level data were nested within the person. Because these observations are interdependent, ordinary least square regression analysis does not suffice which means that higher level structured analysis is required (Snijders & Bosker, 1999). The best way to analyse such data is by means of multi-level analysis using the hierarchical linear modelling approach (Raudenbush & Bryk, 2002). In order to test the model, the MLWin Package was used (Rasbash, Browne, Healy, Cameron, & Charlton, 2000). The independent variables were grand-mean centred, and we used random intercept and random slope modelling (Hox, 2002; Nezlek, 2001).

A staged approach was used to build equations for the independent job resources variables, and the dependent variables work engagement and performance in the following way. To test Hypothesis 1, we built an equation where weekly work engagement was the dependent variable; the independent job resources variables were introduced in the intercept only model, after including the control variables. To validate the findings and to test whether the relations between job resources and work engagement are not an artefact of the process as described in Hypothesis 4 (that work engagement is positively related to job resources), we tested whether job resources are positively related to work engagement in the subsequent week, after controlling for previous week's work engagement (i.e. measured in the same week as the job resources).

Hypothesis 2, with job performance as the dependent variable, was tested by a series of models including an intercept-only model, a model with the control variables, and a model with work engagement as predictor. Hypothesis 3 was tested as prescribed by Kenny, Korchmaros, and Bolger (2003). First, a model was built with job resources as predictors of performance. Next, engagement was added to the model. In line with the procedures of Kenny and colleagues, we first tested whether the separate paths in the mediation model were fixed or random. This was done by calculating the variance components for the effects and test whether they differ significantly from zero. If they do not differ significantly from zero, the path is fixed. If one of the paths in the mediation model is fixed, one is able to use ordinary mediation estimation methods (Kenny *et al.*, 2003). In that case, Sobel tests can be conducted to assess partial or full mediation (Sobel, 1982).

For Hypothesis 4, 'lagged-variables' were created, to be able to test the hypothesis that current work engagement predicts job resources in subsequent weeks, after controlling for previous week's job resources (Hox, 2002). Specifically, work engagement during the first four weeks was used as a predictor of job resources in

subsequent weeks. Work engagement during the last week (week 5) was treated as missing in this series of analyses. Four models were tested, in which each of the four job resources was a dependent variable in one model, and work engagement and the job resource in the preceding week the predictors.

Results

Descriptive statistics

Exploratory factor analysis using all weekly job resources items produced *four* instead of five different factors (see Table 1). The feedback and supervisory coaching items loaded on a single factor. These two job resources were therefore treated as a single variable in all further analyses. Both feedback and supervisory coaching included items regarding the exchange relationship between the supervisor and the teacher. Hence, this combined factor was labelled 'exchange with supervisor'.

Table 2 shows the means, standard deviations, reliabilities, and the correlations between the observed variables. The five measurements of each participant were averaged across the weekly occasions for these descriptive analyses. All constructs have reliabilities of .77 or higher, with one exception. Social support has a reliability coefficient of .64. As can be seen in Table 2, job resources correlate positively with work engagement and performance. In addition, engagement is positively related to performance.

Hypotheses testing

The first hypothesis stated that weekly job resources are positively related to weekly work engagement. The results of multi-level analyses are shown in Table 3. Week-levels of autonomy ($\gamma = .236, p < .001$), exchange with the supervisor ($\gamma = .165, p < .001$), and opportunities for development ($\gamma = .193, p < .001$), were positively related to weekly work engagement. However, social support was unrelated to engagement ($\gamma = .014$). The $\Delta - 2 \times \log$ value was significant ($\Delta - 2 \times \log = 86.816, p < .001$), indicating a significant improvement of the model including job resources over the intercept-only model. In sum, the first hypothesis was largely confirmed. Week-levels of autonomy, exchange with the supervisor, and opportunities for development were all positively related to weekly engagement, whereas social support was not.

To validate these findings, the hypothesis was also tested with work engagement in the subsequent week as the dependent variable, and work engagement and job resources in the previous week as predictors. Engagement was a significant predictor of engagement in the subsequent week ($\gamma = .160, p < .05$). In addition, autonomy ($\gamma = .124, p < .05$) and opportunities for development ($\gamma = .210, p < .01$) were significant predictors of engagement in the subsequent week. However, momentary social support ($\gamma = -.006, ns$) and exchange with the supervisor ($\gamma = .035, ns$) did not explain unique variance in next week's engagement, after controlling for previous week's engagement.

Our second hypothesis stated that work engagement is positively related to job performance. Table 4 displays the results. This hypothesis is confirmed as well; work engagement is positively related to job performance ($\gamma = .424, p < .001$). The model including work engagement was significantly better than the intercept-only model, $\Delta - 2 \times \log = 82.884, p < .001$.

Table 1. Results of factor analysis (PCA, varimax rotation) for the weekly job resources

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|------------|----------------|----------------|---------------|
| Autonomy | | | | |
| Able to decide myself how to execute my work | .18 | .16 | .89 | .04 |
| A lot of freedom in the execution of my work | .18 | .22 | .87 | .11 |
| The opportunity to decide myself the order of my work | .16 | .14 | .81 | .29 |
| Social support | | | | |
| Colleagues had attention for my feelings and problems | .21 | .13 | .23 | .75 |
| Colleagues helped me with a task | .01 | .03 | .06 | .86 |
| A nice atmosphere at work | .33 | .39 | .20 | .45 |
| Exchange with supervisor: feedback | | | | |
| Received enough information about the quality of my performances | .80 | .24 | .04 | .17 |
| Received enough feedback of my supervisor indicating how well I do my job | .90 | .11 | .08 | .03 |
| Exchange with supervisor: supervisory coaching | | | | |
| My supervisor used his/her influence to help me with problems at work | .67 | -.08 | .18 | .16 |
| My supervisor informed me whether he/she is satisfied with my work | .85 | .16 | .22 | .04 |
| My supervisor was friendly and open | .64 | .41 | .18 | .04 |
| Opportunities for development | | | | |
| My work offered me the opportunity to learn new things | .25 | .86 | .08 | -.03 |
| I had sufficient possibilities to develop myself at work | .17 | .88 | .17 | .12 |
| I had the opportunity to develop my strengths | -.01 | .74 | .32 | .24 |
| Eigenvalue | 5.63 | 1.92 | 1.47 | 1.21 |
| Cumulative % explained variance | 40% | 54% (+ 14%) | 64% (+ 10%) | 73% (+ 8%) |

Table 2. Means, standard deviations, reliabilities (on the diagonal), and correlations between the model variables, $N = 54$

| | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------------|------|------|-----|-----|-----|-----|-----|-----|
| 1. Autonomy | 5.23 | 1.03 | .88 | | | | | |
| 2. Social support | 5.09 | 0.68 | .57 | .64 | | | | |
| 3. Exchange with supervisor | 4.97 | 1.06 | .49 | .39 | .87 | | | |
| 4. Opportunity for development | 5.44 | 0.86 | .61 | .41 | .37 | .85 | | |
| 5. Work engagement | 4.13 | 0.75 | .57 | .42 | .27 | .66 | .89 | |
| 6. Performance | 3.68 | 0.54 | .40 | .21 | .21 | .60 | .64 | .77 |

Note. All correlations are significant at the $p < .01$ level (two-tailed).

Table 3. Multilevel estimates of the models predicting weekly work engagement

| Variable | Null model | | Model 1 | | Model 2 | |
|----------------------------|------------|---------|----------|---------|----------|---------|
| | Estimate | SE | Estimate | SE | Estimate | SE |
| Intercept | 4.172 | 0.102 | 5.710 | 1.355 | 2.766 | 1.057 |
| Gender | | | -0.367 | 0.348 | -0.191 | 0.260 |
| Age | | | -0.053 | 0.064 | -0.072 | 0.048 |
| Autonomy | | | | | 0.236* | 0.045 |
| Social Support | | | | | 0.014 | 0.054 |
| Exchange supervisor | | | | | 0.165* | 0.046 |
| Opportunities Development | | | | | 0.193* | 0.054 |
| - 2 × log | | 611.340 | | 609.095 | | 520.279 |
| Δ - 2 × log | | | | 2.245 | | 88.816* |
| df | | | | 2 | | 4 |
| Level 1 intercept variance | 0.435 | 0.106 | 0.412 | 0.101 | 0.203 | 0.055 |
| Level 2 intercept variance | 0.482 | 0.049 | 0.482 | 0.049 | 0.361 | 0.036 |

* $p < .001$.

Hypothesis 3 stated that weekly work engagement is a mediator of the relationship between job resources and performance. To test this hypothesis, we followed the procedure described by Kenny *et al.* (2003). First, we tested whether job resources predicted job performance. Autonomy ($\gamma = .083$, $p < .05$), and opportunities for development ($\gamma = .190$, $p < .001$) were significant predictors of performance. Social support and exchange with the supervisor were not significantly related to performance. The inclusion of job resources significantly improved the model compared to the model with the control variables, $\Delta - 2 \times \log = 43.686$, $p < .001$. We have seen that weekly job resources are positively related to weekly work engagement. To examine whether work engagement mediated the job resources - performance relationship, work engagement was tested as predictor of job performance. Work

Table 4. Multilevel estimates of the models predicting weekly job performance

| Variable | Null model | | Model 1 | | Model 2 | |
|----------------------------|------------|---------|----------|---------|----------|---------|
| | Estimate | SE | Estimate | SE | Estimate | SE |
| Intercept | 3.667 | 0.073 | 5.211 | 0.961 | 2.790 | 0.798 |
| Gender | | | -0.254 | 0.247 | -0.095 | 0.197 |
| Age | | | -0.059 | 0.046 | -0.037 | 0.036 |
| Engagement | | | | | 0.424* | 0.043 |
| - 2 × log | | 502.626 | | 499.236 | | 416.352 |
| Δ - 2 × log | | | | 3.39 | | 82.884* |
| df | | | | 2 | | 1 |
| Level 1 intercept variance | 0.205 | 0.054 | 0.188 | 0.051 | 0.110 | 0.032 |
| Level 2 intercept variance | 0.331 | 0.033 | 0.331 | 0.033 | 0.246 | 0.025 |

* $p < .001$.

engagement was significantly related to job performance ($\gamma = .099, p < .05$). Finally, work engagement was added to the model in which job performance was predicted by the job resources (see Table 5 for the results of the mediation analysis). The model improved significantly, $\Delta - 2 \times \log = 47.578, p < .001$. Weekly work engagement was a significant predictor of weekly performance after controlling for job resources ($\gamma = .366, p < .001$).

Next, we tested whether the slopes of job resources with work engagement and the slope of work engagement with job performance were fixed or random. It was revealed that the covariance for the path from job resources to work engagement differed significantly from zero. However, the covariance for the path from work engagement to performance did not differ significantly from zero (deviance test $\Delta - 2 \times \log = 2.03, ns$), and therefore conventional mediation methods could be used. Work engagement fully mediated the relationship between autonomy and job performance (Sobel test $z = 4.23, p < .001$). In addition, weekly work engagement partially mediated the relationship between weekly opportunities for development and week-levels of performance. Opportunities for development was still a significant predictor of job performance, but the value of the coefficient decreased significantly ($\gamma = .114, p < .001$ vs. $\gamma = .190, p < .001$; Sobel test $z = 3.20, p < .01$). Thus, Hypothesis 3 was confirmed for autonomy and opportunities for development, but rejected for social support and exchange with the supervisor.

Gain spiral

The fourth hypothesis stated that weekly work engagement is related to future job resources. The results are shown in Table 6. The $\Delta - 2 \times \log$ likelihoods are based on a

Table 5. Multilevel estimates of the models in which weekly work engagement mediates the relationship between job resources and performance

| Variable | Model 1 | | Model 2 | |
|----------------------------|----------|-----------|----------|-----------|
| | Estimate | SE | Estimate | SE |
| Intercept | 3.243 | 0.855 | 2.256 | 0.800 |
| Gender | -0.095 | 0.209 | -0.028 | 0.193 |
| Age | -0.061 | 0.039 | -0.036 | 0.036 |
| Autonomy | 0.083* | 0.039 | -0.003 | 0.038 |
| Social Support | 0.011 | 0.048 | 0.005 | 0.043 |
| Exchange supervisor | 0.067 | 0.039 | 0.011 | 0.037 |
| Opportunities | | | | |
| Development | 0.190*** | 0.047 | 0.114** | 0.044 |
| Engagement | | | 0.366*** | 0.051 |
| - 2 × log | | 455.550 | | 407.972 |
| $\Delta - 2 \times \log$ | | 43.686*** | | 47.578*** |
| df | | 4 | | 1 |
| Level 1 intercept variance | 0.118 | 0.036 | 0.102 | 0.030 |
| Level 2 intercept variance | 0.291 | 0.029 | 0.239 | 0.024 |

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

$\Delta - 2 \times \log$ for Model 1 is based on the comparison with the intercept only model not shown in table).

comparison with the models including the control variables and the job resource in the previous week, which are not shown in the table. For all four job resources work engagement turned out to be a significant predictor of job resources in the subsequent week: autonomy: $\gamma = .451, p < .001$; social support: $\gamma = .229, p < .001$; exchange with supervisor: $\gamma = .237, p < .01$; opportunities for development: $\gamma = .311, p < .001$. These findings offer strong support for Hypothesis 4. Current work engagement leads to higher levels of job resources (i.e. autonomy, social support, exchange with supervisor, and opportunities for development) in the subsequent week, after controlling for previous week's job resources.

Discussion

The central aim of the present study was to examine the intra-individual relationship between job resources, work engagement, and job performance. We predicted that weekly variations in job resources would be predictive of work engagement and self-rated performance. The study makes three important contributions. First, our findings support the recently proposed model of work engagement (Bakker & Demerouti, 2008) as they show that a resourceful work environment enhances employees' feelings of work engagement, on a weekly basis. Second, this engagement has a positive relationship with weekly job performance, showing the importance of engagement for teachers. Third, we found evidence for a causal relationship between week-levels of work engagement and job resources, suggesting that engaged workers are able to create their own job resources. The innovativeness of the study is that it examined time-varying predictors of *state* outcomes, thus capturing the dynamic character of the process under study. In what follows, we will discuss the theoretical contributions of this study in more detail.

Theoretical contributions

The finding that weekly job resources have motivational potential and enhance teachers' week-levels of work engagement is consistent with previous between-person studies that showed that employees' general perceptions of job resources are related to their overall levels of work engagement (e.g. Hakanen *et al.*, 2006; Llorens *et al.*, 2007; Schaufeli & Bakker, 2004). However, the present study is one of the first to provide evidence for short-term, positive effects of job resources on work engagement. Week-levels of autonomy and opportunities for development were positively related to same and next week's work engagement, whereas exchange with the supervisor was only positively related to same week's engagement. According to the JD-R model, a resourceful work environment creates confidence that goals can be accomplished, and fulfils employees' need to belong (Bakker & Demerouti, 2007). This satisfaction of basic needs increases employees' work engagement, on a weekly basis.

A second contribution of the present study is that weekly work engagement was a predictor of performance. We used broaden-and-build theory (Fredrickson, 2001) to argue that engaged employees' have the ability to create their own resources, and are therefore more likely to reach their weekly work-related goals. Indeed, our findings showed that teachers with higher levels of vigour, dedication, and absorption in a certain week reported more job resources in the next week - suggesting that they do actively mobilize their own autonomy, support from their colleagues, and opportunities for further development through work. This is consistent with Hobfoll's (2002) claim that people are motivated to create and protect their own resources.

Table 6. Multilevel estimates of the models predicting a lagged effect of engagement on job resources

| Variable | Autonomy, week $T + 1$ | | Social support, week $T + 1$ | | Exchange with supervisor, week $T + 1$ | | Opportunity for development, week $T + 1$ | |
|--|------------------------|-----------|------------------------------|-----------|--|-----------|---|-----------|
| | Estimate | SE | Estimate | SE | Estimate | SE | Estimate | SE |
| Intercept | 4.511 | 0.894 | 3.819 | 0.886 | 3.619 | 0.977 | 6.017 | 0.817 |
| Gender | 0.040 | 0.235 | -0.123 | 0.217 | -0.153 | 0.244 | -0.413* | 0.210 |
| Age | 0.031 | 0.042 | 0.067 | 0.042 | 0.071 | 0.046 | -0.004 | 0.039 |
| Autonomy, week T | 0.499*** | 0.051 | - | - | - | - | - | - |
| Social support, week T | - | - | 0.247*** | 0.067 | - | - | - | - |
| Exchange with supervisor, week T | - | - | - | - | 0.579*** | 0.056 | - | - |
| Opportunity for development, week T | - | - | - | - | - | - | 0.407*** | 0.061 |
| Engagement, week T | 0.451*** | 0.075 | 0.229*** | 0.072 | 0.237** | 0.081 | 0.311*** | 0.074 |
| $-2 \times \log \Delta - 2 \times \log df$ | 538.865 | 53.551*** | 521.121 | 41.385*** | 569.882 | 28.649*** | 508.482 | 34.668*** |
| Level 1 intercept variance | 0.843 | 0.084 | 0.767 | 0.087 | 0.971 | 0.227 | 0.614 | 0.069 |
| Level 2 intercept variance | 0.851 | 0.200 | 0.244 | 0.088 | 0.792 | 0.089 | 0.545 | 0.136 |

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

$\Delta - 2 \times \log$ for the models are based on the comparison with the intercept only model (not shown in the table).

The upward spiral of work engagement and resources has also been found in recent between-persons studies. Xanthopoulou (2007) showed in her research among highly skilled Dutch technicians that T1 job and personal resources resulted in higher levels of work engagement one year later (T2). Simultaneously, work engagement resulted in more personal resources (optimism, self-efficacy, and organization-based self-esteem) and more job resources (social support from colleagues, autonomy, coaching, and feedback) over time. Similar results have been found using between-person studies in a Spanish context (Llorens *et al.*, 2007; see also Salanova *et al.*, 2006), suggesting that engagement triggers an upward spiral and leads to higher levels of self-efficacy over time. Furthermore, Schaufeli, Bakker, and Van Rhenen's (2009) longitudinal study among managers showed that engagement was predictive of increases in next year's job resources, including social support, autonomy, opportunities to learn and to develop, and performance feedback. This all suggests that in comparison with non-engaged employees, engaged employees are better able to mobilize their own job and personal resources that, in turn, fuel future engagement and so forth. In sum, engaged employees are better capable to mobilize their own job resources, in order to cope with their job demands, and perform well.

It should be noted that – despite these findings – there may be conditions under which work engagement is linked to *worse* performance.¹ First, if those high in work engagement are highly aroused, then the levels of arousal might be distracting for cognitive performance (Beal *et al.*, 2005). Second, high positive affect (which we link to engagement) is known to promote heuristic processing that might impede performance where detailed, controlled information processing is needed (see, for example, Martin & Clore, 2001). Future research should test these alternative hypotheses.

Limitations

Some limitations of our study should be noticed. Our research sample comprised a homogeneous group of young starting teachers. They were all of a similar age, most were female, and they all had the same pre-education. Therefore, one must be cautious with generalizing the findings to other occupations. Further research is needed to examine whether the present findings can be replicated in other groups working in other occupational contexts. Nevertheless, our findings do shed light on the motivational process of weekly job resources fostering weekly engagement. Second, the study was based on self-reports that may raise questions of common-method bias. However, the research evidence suggests that individuals in diary studies perform minimal cognitive processing before indicating their current state. It is considered unlikely that individuals take time to access memory for beliefs about how various cognitions should covary. They simply report their readily accessible current states accurately as they exist at a certain point in time (Fisher & Noble, 2004; Robinson & Clore, 2002). In addition, multi-level analyses takes care of interdependence between measurements, and by measuring the variables at different points in time, the probability of common method bias is being reduced (Spector, 2006).

Third, our colleague support measure turned out to have limited reliability, which may have been problematic. Indeed, social support was the only job resource that was unrelated to work engagement. This may have been caused by the errors in the

¹ We thank one of the anonymous reviewers for this suggestion.

measurement of support. Future studies should therefore further examine the motivational potential of support from colleagues. Finally, the study was based on self-ratings of performance, which due to their subjectivity, may be biased (Harris & Schaubroeck, 1988). However, the finding that work engagement is related to performance is consistent with previous studies, which used objective estimations of performance (Bakker, Demerouti, & Verbeke, 2004; Salanova *et al.*, 2005). In addition, our self-ratings of weekly performance were positively related to supervisor-ratings of performance during the first week of the study. Thus, self-ratings of performance do not seem to pose a serious threat in the present study.

Conclusions

Although the number of diary studies is increasing in recent years, there is still limited research on intra-individual variability in employees' work experience. Our weekly study has shown that substantial variability exists in job resources, work engagement, and performance. The findings reveal that a resourceful work environment fosters teachers' weekly work engagement, and can indirectly have a positive effect on job performance. Consequently, the mobilization of weekly job resources should be a significant component of individual interventions and HR training programmes. This may imply a shift from 'standard' job (re)design and training programmes to individual job (re)design and coaching. In such interventions, the work environment is optimized at the *individual* level, and coaching is tailored to individual needs. This can be done by using on-line human resource instruments (Bakker & Demerouti, 2007) that offer real-time and individualized feedback about one's job resources and engagement.

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