



Episodic Demands, Resources, and Engagement

An Experience-Sampling Study

Andrea M. Reina-Tamayo, Arnold B. Bakker, and Daantje Derks

Institute of Psychology, Erasmus University Rotterdam, The Netherlands

Abstract: This study contributes to the literature on work engagement and job demands-resources (JD-R) theory by exploring the momentary relations between episodic demands, resources, engagement, and performance during various activities (e.g., checking e-mails) within a day. Using experience-sampling methodology, 61 Dutch employees completed activity characteristics, engagement, and performance surveys at three different times during the day for one week. Results from 413 observations showed that 88% of the total variance in engagement fluctuates from activity to activity. Multilevel path analysis results confirmed that during activities, episodic engagement was positively related to performance, and mediated the positive associations of resources and negative associations of hindering demands with performance.

Keywords: work engagement, ESM, job demands-resources theory, episodic performance model

According to job demands-resources theory (JD-R; Bakker & Demerouti, 2014), employees are most engaged on days that job demands (e.g., workload) are high and when there are sufficient job resources (e.g., autonomy) available. In the present study, work engagement is defined as “. . . – a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli, Bakker, & Salanova, 2006, p. 702). Vigor refers to high levels of energy, persistence, and the desire to invest considerable effort in work. Dedication is the motivational dimension of work engagement and refers to high levels of enthusiasm, pride, inspiration, and meaning in relation to work. Finally, absorption indicates that one is fully immersed in work activities, while experiencing that time flies (cf. Schaufeli et al., 2006). We argue that engagement does not only fluctuate from day to day, but also from activity to activity as a function of the demands and resources that vary in the activities people are involved in throughout the day. Consider, for example, that a day in the office is full of different activities, from emailing to attending meetings and writing reports. Each of these activities has a different kind of demand (e.g., high workload represented by hundreds of e-mails) and resources (e.g., autonomy in deciding how to perform an activity). Therefore, we would expect that these characteristics of the work activity influenced people to engage and disengage in a particular task. The incremental value of using this momentary within-person design is that we can add a

complementary view of engagement to the one obtained by diary and general-level studies, such as examining if the processes that take place during the day and general level also apply to the episode level.

This perspective is consistent with Kahn’s (1990) conceptualization of engagement as a transient experience that is a function of the “ebbs and flows of work.” Consequently, our research uses the experience-sampling methodology (ESM) to collect data several times a day for one working week and capture the factors that influence the transient experience of engagement with minimal recall bias due to the real-time assessment form. We use the episodic performance model (Beal, Weiss, Barros, & MacDermid, 2005) to provide an episodic context to the dynamic processes proposed by JD-R theory. Specifically, we examine the influence of activity’s resources and demands on engagement and performance within a performance episode: “Behavioral segments that are thematically organized around organizationally relevant goals or objectives” (Beal et al., 2005, p. 1055).

The present study’s contribution is to advance JD-R theory by examining the processes that influence engagement at the momentary level. We use the episodic performance model to contextualize these processes at the moment level (Beal et al., 2005). Thus, we give insight into a dynamic process model that explains moments of what we will call “episodic” engagement within a day.

Theoretical Background

Work engagement was originally conceptualized as a state during which individuals express themselves physically, cognitively, and emotionally during role performances (Kahn, 1990). Furthermore, Bakker and Oerlemans (2011) have argued that work engagement is characterized by high-arousal emotions such as excitement. These conceptualizations emphasize that work engagement is an affective state that, consequently, should fluctuate over time, particularly in response to situational triggers such as being able to use your skills during an activity.

The momentary, transient nature of engagement can be observed in how engagement fluctuates throughout different activities employees perform during a day. White-collar workers, for example, may have meetings with their clients, work on business reports, or answer e-mails. It is unknown how the characteristics of these activities influence employees' engagement levels. Existing theories of engagement do not consider within-day fluctuations in work engagement, but instead propose that engagement levels are relatively stable across days, weeks, or months (Bakker & Demerouti, 2014). In the present study, we argue that activity characteristics, such as how resourceful and demanding the activities are, may immediately relate to engagement and performance.

Episodic Resources and Demands

The present study integrates the episodic performance model with JD-R theory in order to understand the momentary influences of resources and demands on engagement.

We expect that resources will have a positive influence on episodic engagement based on the motivational process proposed by JD-R theory (Bakker & Demerouti, 2014). Job resources refer to those physical, psychological, social, or organizational aspects of the job that help in achieving goals, reduce job demands, and stimulate personal growth and development. Job resources (e.g., feedback) have motivating potential because intrinsically they meet basic human needs (Bakker & Demerouti, 2014). Additionally, job resources enhance people's willingness to invest effort in accomplishing an activity (Bakker & Demerouti, 2014). The increased likelihood of accomplishing a task induces a sense of fulfillment (Hackman & Oldham, 1980) that will boost engagement and performance. In a similar vein, job characteristics theory (Hackman & Oldham, 1980) proposes that five job characteristics (skill variety, task identity, task significance, autonomy, and job feedback) have intrinsic value by inducing the psychological experiences of meaningfulness, responsibility, and sense of results. Therefore, activities that contain any of these

characteristics are expected to influence engagement through the motivational path.

On the other hand, we expect that demands will influence episodic engagement based on the health impairment process proposed by JD-R theory. Job demands are physical, psychological, social, or organizational aspects of the job that require sustained physical and psychological effort, which result in physiological and psychological costs. Job demands (e.g., role conflict) cost effort and consume energetic resources leading to exhaustion, which affects engagement in a negative way (Bakker & Demerouti, 2014).

The episodic performance model contextualizes the influence of resources and demands on engagement during different performance episodes. People thematically organize their days in performance episodes. Effective performance during these episodes depends on stable as well as transient factors that influence attention toward accomplishing an activity (Beal et al., 2005). We propose that within a performance episode, transient factors such as how resourceful or demanding an activity is, will correlate with employees' engagement and their performance. Recent studies using JD-R framework have shown that work engagement fluctuates from day to day, and spikes on the days that are characterized by high resources and high demands (Bakker, 2014). The motivating potential that job resources have on engagement has received empirical support from diary studies. These studies have demonstrated that job resources, such as supportive colleagues, relate positively to daily work engagement (Xanthopoulou & Bakker, 2013). Conversely, there is additional evidence for the health impairment process. Simbula's (2010) diary study offers evidence for the motivating and health-impairing path proposed by JD-R theory showing that on days that teachers experienced higher levels of job demands (work/family conflict), they experienced more exhaustion, leading to lower levels of satisfaction and mental health. On the other hand, on days that teachers reported higher resources (i.e., social support), they experienced higher levels of engagement, satisfaction, and mental health.

In the present study, we argue that the motivational and health impairment processes proposed by the JD-R theory will influence engagement and performance within one performance episode. If we have observed that day-level variability in job demands and resources can trigger the motivational- and health impairment processes at the day level, we can deduce how momentary variability in these job characteristics would also influence engagement at the episode level. For example, Ilies, Dimotakis, and De Pater (2010) revealed that events high on workload lead to affective distress, which in turn leads to lower daily well-being. Other scholars have demonstrated how workers use

job control and social support present in the activity to express affect (Daniels, Harris, & Briner, 2004), and to protect well-being (Daniels, Beesley, Wimalasiri, & Cheyne, 2013). Therefore, we expect JD-R processes to vary accordingly.

In order to represent job resources in the present study, we focused on the five job characteristics proposed by Hackman and Oldham (1980) that have been shown to have considerable motivating potential at the general level – namely autonomy, feedback, skill variety, task significance, and task identity. Hackman and Oldham (1980) defined each facet in the following manner. Autonomy refers to the extent to which employees have control over what to do and the time frame for completing an activity. Feedback is defined as the extent to which employees receive information on how well they are performing. Task significance refers to the extent to which the employees' work has an impact on other people or the community at large. Finally, task identity is defined as the extent to which employees are accomplishing a complete identifiable outcome. Accordingly, we propose that the same motivating mechanism triggered by these job characteristics at the general level might also be applicable to the episode level. Thus, we predict:

Hypothesis 1: Episodic resources (autonomy, feedback, skill variety, task significance, and task identity) are positively related to episodic engagement.

Furthermore, in terms of job demands, we focused on role conflict and workload. Role conflict occurs when a person experiences two or more role demands in a workspace and complying with one demand impedes compliance with the other demand (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Workload refers to a person investing high effort in meeting job demands (Ilies et al., 2010). We chose these demands because in the past decade the literature on demands suggests that different demands may have opposite effects on well-being depending on how challenging or hindering demands are experienced (Crawford, Lepine, & Rich, 2010). Previous research has suggested that workload may be categorized as a challenge demand and role conflict as a hindering demand (e.g., Crawford et al., 2010). The present study will be the first to explore the immediate link of these demands to well-being. The closest study that resembles these dynamic relations between demands and engagement is Tadić, Oerlemans, and Bakker's (2014) diary study among teachers. This study found that daily challenge demands, including workload, have positive effects on daily work engagement and daily positive affect because teachers experience them as rewarding and meaningful. In contrast, daily hindering demands, including role conflict, have negative effects on daily work engagement and daily

positive affect because teachers experience that these demands are not aligned with their interests and values. In the current study, employees report their experience of role conflict and workload in regard to the work activity they are doing at different moments of the day. Thus, we predict:

Hypothesis 2a: Episodic hindrance demands (i.e., role conflict) are negatively related to episodic engagement.

Hypothesis 2b: Episodic challenge demands (i.e., workload) are positively related to episodic engagement.

In addition to the main effects of demands and resources, JD-R theory also proposes interaction effects (Bakker & Demerouti, 2014). In the present study, we focus on how the motivational process can be enhanced as opposed to how the health impairment process is buffered (i.e., when resources reduce the effect of demands on exhaustion). Specifically, we expect that episodic demands can boost the positive impact of episodic resources on engagement because these resources become salient when the demands are high (Bakker & Demerouti, 2014). Thus, based on JD-R theory, we aimed to test whether episodic demands moderate the relation between highly resourceful activities and episodic engagement. Accordingly, we formulated the following hypotheses:

Hypothesis 3: Episodic role conflict and workload boost the effect of episodic autonomy, feedback, skill variety, task significance, and task identity on engagement. Specifically, the positive relationship between resources and engagement is stronger when demands are high (vs. low).

Validity of Episodic Engagement

For all our hypotheses, we hold that the conceptual space of work engagement follows the three-dimensional structure of vigor, dedication, and absorption proposed by Schaufeli et al. (2006). Therefore, we decided to conduct a multilevel confirmatory factor analysis (MCFA) to test whether the structure of episodic engagement may be similar on both the between-person level and episode level. With this analysis, we expect to find that person-level engagement will be positively related to episodic engagement.

Hypothesis 4: Employees' averaged report of their level of engagement in various activities (their episodic engagement) is positively related to general work engagement.

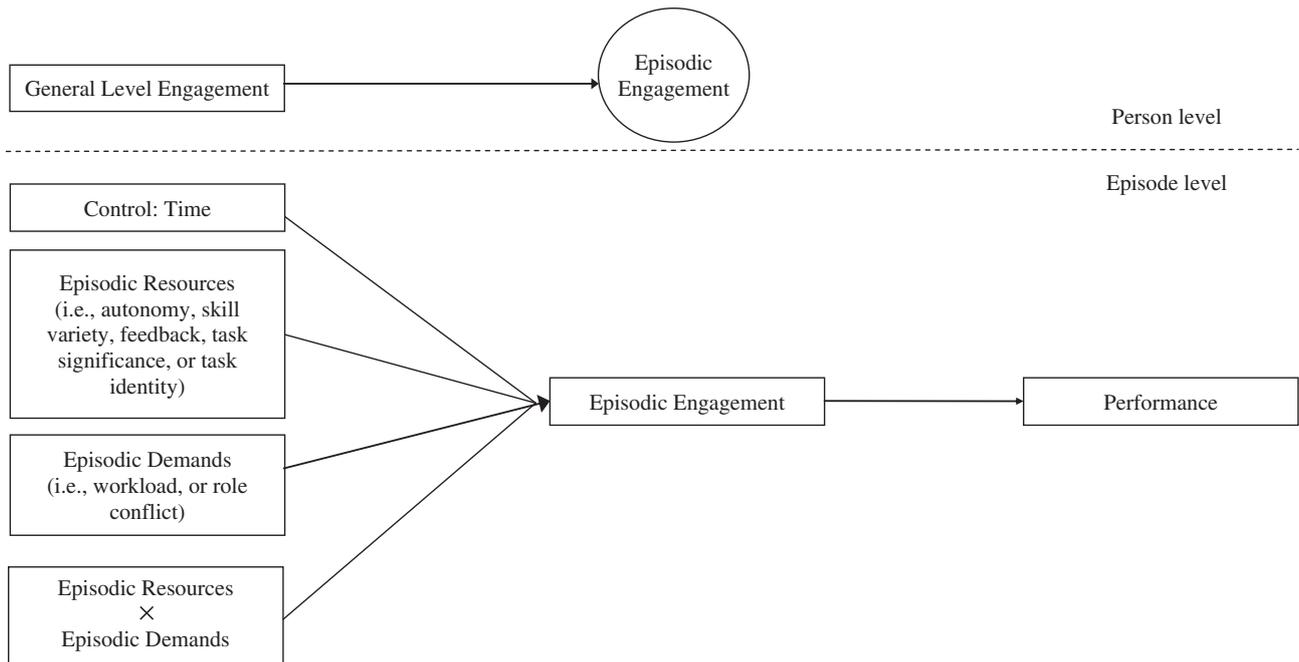


Figure 1. Episodic engagement model. Episodic Engagement at the person level is in a circle because this latent variable refers to individual baselines (variation between persons).

In order to assess the convergent validity of our measure, we propose that episodic engagement will be positively related to episodic performance. According to JD-R theory, work engagement leads to positive organizational and personal outcomes (Bakker & Demerouti, 2014). There is ample empirical evidence that work engagement is related to job performance (Bakker & Bal, 2010; Halbesleben, 2010). Similarly, we expect engagement to be positively related to performance within a performance episode. The reason for this positive relation can be understood within Beal et al.'s (2005) episodic performance model which states that the more one focuses one's attentional resources on a task, the better one's performance will be during the task. Because engaged workers experience high levels of vigor (i.e., energy) and absorption (i.e., concentration) toward their work this implies that they will allocate their energetic and cognitive resources to the activity they are doing. We expect this to result in optimal performance.

Hypothesis 5: Episodic engagement is positively related to episodic performance and mediates the relationship between (a) episodic demands and resources, and (b) episodic performance.

Figure 1 gives an overview of all the hypothesized relationships including time as a control variable. In testing our hypotheses, we preferred conducting a path analysis over separate regression analysis because the path model allows various predictors to be entered in the same model

and assess their *unique* contribution relative to the other predictors. In addition, with the path model, we are able to assess the indirect effect of all resources and demands on performance through engagement. Finally, the path model provides fit indices indicating how well the model fits the data (Streiner, 2005).

Method

Procedure

The study was advertised on different online media channels (e.g., LinkedIn, Facebook, Twitter) as an online study in the Netherlands that monitors engagement levels throughout the day. Via the advertisement link, participants were invited to register for the research project by filling out a survey with their contact details. Participation was voluntary and there was no reward.

After registration, participants received an email with a link to fill out a web-based questionnaire about general work engagement and demographics. In order to assure participants' anonymity, the responses were identified with a unique ID and stored in a separate database from the participants' contact details database.

Additionally, participants were given the successive week to collect data using ESM. ESM requires participants to answer brief questionnaires at random times throughout the day, in order to capture real-time information

about their context and subjective experiences without retrospective bias (Hektner, Csikszentmihalyi, & Schmidt, 2007).

Throughout the ESM part of the study, data was collected using the Engagement app, a smartphone application for iPhone and Android mobile phones. Signal-contingent experience sampling was used, hence participants reported their episodic experience when they were signaled by the app. Participants received three alerts per day via the app at random times, between 9:00 and 17:00 from Monday to Friday. The signals were at least 1 hr apart. These alerts directed the participants to the app, which asked them to record their time-stamped answers about the activities they were executing in real time. All questionnaires were in Dutch.

Participants

Of the 112 Dutch participants who enrolled in the study, 61 completed the general questionnaire as well as at least one experience-sampling measure. These participants were included in our analyses. The average number of experience-sampling measures filled in was 6.77 ($SD = 4.50$), with 43% of the participants answering 1–5 times, 29% answering

6–10 times, and 28% of the participants answering 11–15 times out of 15 total prompted responses during the working week. The distribution of the observations was as follows: 44% of the observation were for the first 1–5 times, 28% for the middle 6–10 times, and 28% for the last 11–15 times. In total, 430 activities were obtained from 61 individuals (response rate: 45%). A comparison of participants who filled out general questionnaires only versus those who also filled out the episodic assessments yielded no significant differences in age, gender, educational level, and person-level engagement. Furthermore, participants who filled out one experience-sampling survey versus those who filled out more than one survey did not differ regarding mean momentary engagement scores, $M = 5.33$ ($SD = 1.10$) versus $M = 4.79$ ($SD = .69$), $t(9.10) = -1.42$, ns.

The average age of the sample who participated in the study was 36.40 years ($SD = 10.26$) and 57% of the sample was female. On average, the employees worked 39.26 hr per week ($SD = 9.60$) and 74% of the sample held a university degree. There were 28% participants living together with a partner, 30% living alone, and 31% had a family with children. Participants were mainly from white-collar jobs, 28% were financial/HR advisors, 11% were managers, 11% were researchers, and 16% were social

Table 1. Coding frame and example findings of episodic activities

Category	Description	Examples
Performing a solitary work activity	<ul style="list-style-type: none"> The person is working alone on a work-related task. The person can be emailing, doing administrative work, working on reports, driving to visit a client, patient, or appointment. While doing the work-related task, the person is not interacting with someone else. 	<p>“Installing an oracle interface”</p> <p>“Reading an e-mail that contains an exciting question about the board I chair”</p> <p>“Driving to client”</p>
Performing a nonwork-related activity	<ul style="list-style-type: none"> During this activity, the person is not doing a task that is work related. Even if the person is in the office, the person can be taking a break alone or with a colleague, or chatting with colleagues. The person can be performing a task at home with kids, driving, walking, and commuting from one place to another. The person does not emphasize any work-related issue during the description of the activity. 	<p>“Watching TV”</p> <p>“Going home in the train”</p> <p>“Drinking coffee with colleagues”</p>
Performing an interpersonal work activity	<ul style="list-style-type: none"> The person is executing a work-related task that requires social interaction. During this time, the person is doing a work activity with other(s). The interactions can be face to face, over the phone, through video chatting, or any communication medium where the person receives immediate social feedback. The person can be in a meeting, workshop, lecture, class, or conference where work-related issues are discussed. 	<p>“Conference call with the supplier”</p> <p>“Meeting with executives via Skype”</p> <p>“Calling”</p>

or health service employees. Lastly, we coded the open-ended responses to the activity question into categories by means of thematic analysis. Coding categories were derived from the raw data. The category of the activity took into account the location and type of company the person had while doing the activity. Table 1 provides the coding frame that we developed for categorizing the episodic activities, including several examples of each code. We had 10% of the data scored by a second rater who was blind to the study hypotheses. The inter-rater reliability showed substantial agreement ($\kappa = .77$). Of the 430 reported activities, 48% ($N = 208$) corresponded with performing solitary work activities, 35% ($N = 149$) with performing interpersonal activities, and 17% ($N = 73$) with performing nonwork activities.

Measures

General Assessments

Person-Level Work Engagement

This was measured with the 9-item Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). These items covered the three-dimensional structure of work engagement: vigor (sample item: “I feel strong and vigorous in my work”), dedication (sample item: “I am enthusiastic about my job”), and absorption (sample item: “I get carried away by my work”). Participants answered the items ($\alpha = .93$) on a 7-point frequency rating scale (0 = *never*, 6 = *always*).

Episodic Assessments

Ohly, Sonnentag, Niessen, and Zapf (2010) recommend using abbreviated scales or even single-item measures when conducting diary studies by selecting items with the highest item-total correlation from a multi-item scale in order to reduce the burden on the participants. In the present study, we used this procedure to select the items for the episodic measures and therefore we had several 1-item measures. In addition, the scales were adapted to the activity level by reframing the question to the amount of engagement, resources, and demands people experienced during the activity they were doing just before they were signaled by the app. All items were scored on a 7-point scale (1 = *not at all*, 7 = *very much*) except for performance.

Episodic Activities

These were measured with one open-ended question (i.e., “What activity were you doing?”) and two questions about location and accompanying person.

Episodic Engagement

This was assessed with three items of the UWES (Schaufeli et al., 2006) covering the three dimensions of engagement:

vigor (item: “During this activity, I feel full of energy”), dedication (item: “During this activity, I feel enthusiastic about what I do”), and absorption (item: “During this activity, I am totally immersed in what I do”). The average coefficient α for the engagement scale across the measurement occasions was .81 ($SD = .05$).

Episodic Resources

These were measured using five items from the validated Dutch version of the Job Diagnostic Survey (Valkeneers, Bossaert, & Buys, 2011). These items cover five aspects of the job characteristic model: autonomy (item: “Could you take part in decision-making that has to do with this activity?”), feedback (item: “This activity gives me a lot of information about how (good or bad) I perform”), task significance (item: “The way I implemented this activity has a significant influence on other people”), task variety (item: “The activity requires a lot of my skills and talents”), and task identity (item: “This activity has a clear beginning and end”).

Episodic Demands

These were assessed with two items from Rodell and Judge’s (2009) instrument. The first one being a workload item, namely “Do you work extra hard during this activity?” The second one being a role conflict item, namely “Do you experience conflicting demands during this activity?”

Episodic Performance

This construct was measured using one item (“How would you rate your performance on the activity you were doing?”) proposed by Fisher and Noble (2004). The rating scale ranged from 1 to 5 and the anchors were bad, poor, average, good, and excellent.

Strategy of Analysis

The data had a hierarchical structure with episodes nested within persons. Therefore, multilevel linear modeling (MLM) was used to distinguish between two levels of analyses: The between-person level (level 2) and the episode level (level 1). Person-level predictor variables were centered on the grand mean, and episode-level predictor variables were centered on the person mean. Data was analyzed using IBM SPSS 19.0 and Mplus. Zero-order correlations were used to examine the relations between the predictor variables (episodic resources and demands) and dependent variables (episodic engagement and performance). Hypotheses were tested by MLM path analysis in Mplus. For each hypothesized interaction effect, we tested various path models that included three predictors (one of the two episodic demands, one of the five episodic resources) and two dependent variables (episodic

engagement and episodic performance). In total, we tested 10 different models, one for each possible interaction effect between each episodic demand and episodic resource included in the study. Figure 1 graphically represents the model that was applied for each of the two episodic demands and five episodic resources separately. In order to test if an interaction contributed to the explained variance in episodic engagement and performance, a model with and without the interaction term was tested and the ΔR^2 was calculated.

In order to evaluate the fit of our models, multiple fit indices were used: chi-square, Tucker-Lewis index (TLI; Tucker & Lewis, 1973), the comparative fit index (CFI; Bentler, 1990), the root-mean-square error of approximation (RMSEA, Steiger, 1990), and the standardized root-mean-square residual (SRMR). Values equal to or lower than .08 for RMSEA and SRMR in addition to values greater than .90 for CFI and TLI are considered to indicate good model fit (Kline, 2005). In addition, we examined the measurement model of engagement to support the operationalization.

Results

Descriptive Statistics

Table 2 shows zero-order correlations and descriptive statistics for the study variables. Before testing the hypotheses, intraclass correlation coefficients were obtained from intercept only MLMs. It was found that no less than 88% of the total variance in engagement, 85% of skill variety, 72% of task identity, 80% of feedback, 85% of autonomy, 93% of task significance, 83% of workload, 67% of role conflict, and 87% of performance was attributable to within-person variation. This means that there is considerable variation at the episode level for each of the model variables.

Measurement Model

Furthermore, in order to test the validity of our episodic engagement measure, we conducted a MCFA to the episodic and person-level engagement items. The results supported the representation of vigor, dedication, and absorption in one general engagement factor at the episode and person level, $\chi^2(8) = 13.39$, RMSEA = .02; CFI = 0.99; TLI = 0.98; SRMR (within-level) = .00, SRMR (between-level) = .07. Factor loadings for the one-factor solution ranged from .67 to .86 at the within-person level. The output of this MCFA is available from the first author upon request.

Test of the Structural Model

Hypotheses were tested with MLM path analysis and the estimator used was Maximum Likelihood Robust (MLR). We expected a positive relation between episodic resources and engagement (Hypothesis 1). In all models, episodic feedback ($\gamma = .31$, $SE = 0.06$, $p < .001$, $\gamma = .33$, $SE = 0.04$, $p < .001$), autonomy ($\gamma = .22$, $SE = 0.05$, $p < .001$, $\gamma = .23$, $SE = 0.06$, $p < .001$), skill variety ($\gamma = .44$, $SE = 0.05$, $p < .001$, $\gamma = .41$, $SE = 0.05$, $p < .001$), and task significance ($\gamma = .12$, $SE = 0.06$, $p < .05$, $\gamma = .17$, $SE = 0.06$, $p < .01$) were related to engagement. However, task identity was not related to engagement ($\gamma = .01$, $SE = 0.05$, $p = .908$, $\gamma = -.00$, $SE = 0.04$, $p = .936$). These results offered the first partial evidence for Hypothesis 1. Furthermore, we expected hindering demands to be negatively related to engagement (Hypothesis 2a) and challenging demands to be positively related to engagement (Hypothesis 2b). Role conflict was negatively related to engagement in three out of the five models ($-.10 < \gamma < -.15$, $p < .05$), but workload was not related to engagement in four out of the five models ($-.02 < \gamma < .08$, $p > .05$). Thus, we found limited support for Hypotheses 2a and 2b.

Table 2. Summary of intercorrelations, means, and standard deviations for the study variables

	M	SD	1	2	3	4	5	6	7	8	9
1. Engagement	4.87	0.78	–	.25***	.32***	.42***	.15**	.01	.08	–.11*	.55***
2. Autonomy	5.11	1.35	.19	–	.18***	.20***	.18***	.04	.07	–.01	.17***
3. Feedback	3.14	1.18	.28*	.17	–	.49***	.33***	.06	.32***	.13**	.26***
4. Skill variety	3.88	1.19	.24	.26*	.41**	–	.32**	.04	.42***	.10*	.28***
5. Task significance	4.29	1.27	.16	.46***	.22	.54***	–	.01	.30***	.18***	.15**
6. Task identity	5.04	1.61	.17	.13	.23	.06	–.09	–	.04	–.06	.14**
7. Workload	2.54	1.04	.07	.21	.53***	.43**	.29*	.04	–	.25***	.03
8. Role conflict	2.41	1.21	–.17	.05	.31*	.27*	.24	–.04	.53***	–	.01
9. Performance	3.65	0.56	.53***	.16	.22	–.04	–.15	.36**	.04	–.06	–
10. Engagement ^a	5.00	1.04	.51***	.26*	.02	.04	.05	.12	–.11	–.20	.36**

Notes. Below the diagonal, episode-level variables were averaged across 5 days ($n = 61$). Above the diagonal, episode-level data ($n = 412-431$) were person centered. ^aPerson-level variable. All other variables are episode-level variables. * $p < .05$, ** $p < .01$, *** $p < .001$.

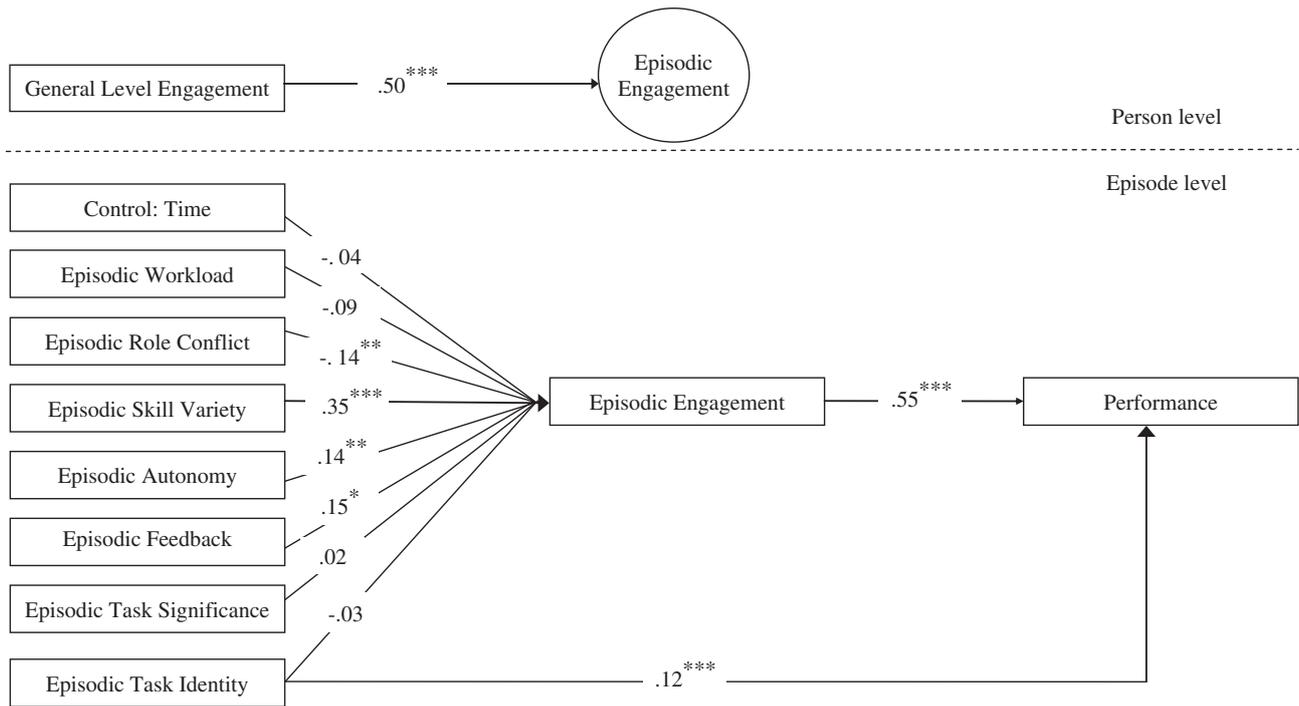


Figure 2. Episodic engagement model showing standardized estimates, $N = 61$, $N = 413$ activities. * $p < .05$, ** $p < .01$, *** $p < .001$. Non-significant direct effects to performance are not shown for clarity purposes.

For Hypothesis 3, we predicted interaction effects between resources and demands on engagement. However, only 1 out of the 20 possible interactions was significantly related to engagement and this interaction was in an unexpected direction. In this interaction, workload moderated the relation between task significance and episodic engagement ($\gamma = -.14$, $SE = 0.05$, $p < .01$), in such a way that the positive relation between task significance and episodic engagement disappeared when the workload was high. Furthermore, adding the interactions to the separate models did not explain unique variance in episodic engagement and performance, except for the interaction between workload and task significance with a ΔR^2 of 2%. The table containing all possible interactions and main effects is available from the first author upon request.

In order to examine the unique predictive value of each resource and demand, a second model without the interactions and with indicators for all the resources and demands together was tested. Model two is displayed in Figure 2. This model fitted well to the data, $\chi^2(1) = 1.48$, $RMSEA = .03$; $CFI = 0.99$; $TLI = 0.96$; $SRMR = .01$ (within-level) and $.00$ (between-level).

In this second model, we expected the paths from resources to engagement to be positive and significant (Hypothesis 1). While autonomy ($\gamma = .14$, $SE = 0.05$, $p < .01$), feedback ($\gamma = .15$, $SE = 0.06$, $p < .05$), and skill variety ($\gamma = .35$, $SE = 0.06$, $p < .001$) were positively related to engagement, task significance and task identity were not

significantly related to engagement. Thus, this new analysis and new model further confirmed that Hypothesis 1 is partially supported. In addition, we expected the path from role conflict and engagement to be negative (Hypothesis 2a) and the path from workload and engagement to be positive (Hypothesis 2b). We found role conflict was negatively related to engagement ($\gamma = -.14$, $SE = 0.05$, $p < .01$), but workload was not related to engagement ($\gamma = -.09$, $SE = 0.07$, $p = .06$). Thus, Hypothesis 2a was supported, but Hypothesis 2b was not supported.

Hypothesis 4 stated that the measure of episodic engagement would be positively related to person-level engagement. The results of the path analysis indicated that these two measures indeed related positively and significantly ($\gamma = .50$, $SE = 0.14$, $p < .001$). This finding together with the reliability and the MCFA of the scale confirms that the short scale adequately assesses episodic engagement, supporting Hypothesis 4.

Hypothesis 5 stated that engagement mediates the relationship between episodic resources and demands to performance. Results showed that the path from engagement to performance was significant ($\gamma = .55$, $SE = 0.04$, $p < .001$). Furthermore, in order to test the significance of the indirect effects, Selig and Preacher's (2008) online interactive tool was used. This tool uses the parametric bootstrapped method to create confidence intervals. Table 3 shows that the mediation effects were significant for skill variety, autonomy, feedback, and role conflict, but not for

Table 3. Maximum likelihood estimates, standard errors, and bootstrapped confidence intervals for the indirect effects ($N = 61$, $N = 413$ activities)

	Unstandardized			95% CI	
	Estimate	Standard error	p	Lower	Upper
1. Skill variety → Engagement → Performance	.10	.02	< .001	.07	.14
2. Autonomy → Engagement → Performance	.04	.01	< .05	.01	.06
3. Feedback → Engagement → Performance	.04	.02	< .05	.01	.08
4. Role Conflict → Engagement → Performance	-.05	.02	< .01	-.08	-.02

task identity, task significance, and workload because the latter job characteristics were not directly related to episodic engagement in the first place. This means that Hypothesis 5 was partially supported. The final mediation model (see Figure 2) included the direct effects of episodic resources and demands on performance. In this model, episodic resources and demands explained 23% of the variance in episodic engagement.

Discussion

This study set out to explore episodic fluctuations in engagement and examined the most proximal predictors and consequences of this experience. We found that engagement is highly dynamic and fluctuates significantly and substantially from one activity to another. This extends our knowledge on engagement by providing quantitative empirical evidence to Kahn's (1990) proposal that engagement is constantly changing depending on the characteristics of the activity. In addition, engagement explained the positive relations between how resourceful or how demanding an activity is to performance. In this study, we decided to test all the variables together in one path analysis to test the episodic engagement model because in this way we were able to examine the structural relationships between all the model variables (Streiner, 2005). The fit indices showed that the proposed model fitted well to the data. Previous studies on work engagement using JD-R theory (e.g., Hakanen, Perhoniemi, & Toppinen-Tanner, 2008; Schaufeli & Bakker, 2004; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009) have used structural equation modeling (SEM) and also found evidence for JD-R theory at the between-person level, by providing evidence for the motivational pathway from job resources to engagement using a range of specific job resources. This study is unique in that it quantitatively tested the existence of episodic changes in engagement and tested the validity of a measure of episodic engagement.

Theoretical Contributions

Episodic Resources

In line with previous research showing that resources have a positive relation with engagement at the person level

(Halbesleben, 2010), week level (Bakker & Bal, 2010), and day level (Xanthopoulou & Bakker, 2013), our study contributes to the literature on engagement by showing that the motivational process proposed in JD-R theory (Bakker & Demerouti, 2014) also takes place at the episode level. Thus, when employees experience more feedback, autonomy, and variety while performing an activity, the employees felt more engaged.

The present study findings give support to the reasoning that resources appear to have an intrinsic value at the episode level that can be due to the immediate fulfillment of psychological needs (i.e., competence, relatedness, autonomy) and the achievement of personal goals (Bakker & Demerouti, 2014). This observation concurs with the fact that the majority of the sample was highly educated (74%), suggesting that taking part in activities that allowed them to apply the different skills correlated with increased feelings of competence. In addition, experiencing autonomy and feedback during the activity could have led to higher levels of competence and relatedness that subsequently led to a higher engagement. Hence, future studies should examine the relation between episodic resources and psychological needs.

Surprisingly, not all resources were related to engagement. Task identity and task significance experienced during the activity were not related to episodic engagement. A possible explanation may be that not all employees perceived these characteristics as motivating. Some employees may even perceive task identity and task significance as threatening. According to Hackman and Oldham (1980), if employees value personal growth, they would find the job characteristics motivating, however, if they do not, they would feel threatened by the job characteristics. It is possible that in our sample, there would be differences in enduring growth need strength that could potentially moderate the relations between task significance and task identity on the one hand, and episodic engagement on the other.

Finally, while examining the correlations among the characteristics of the activities, we observed that the correlation between the episodic resources was not so high that it could cause multicollinearity. The correlations among the episodic resources were in a similar range to previously reported correlations among job characteristics

at the person level (Hackman & Oldham, 1980). The exception in our study was task identity, which was not related to any other task characteristic at the episode level. We suspect this may be because the conceptual space of task identity is independent of the other task characteristics at the episode level.

Episodic Demands

We expected to find episodic hindrance demands to be negatively related to episodic engagement and challenge demands to be positively related to episodic engagement. As predicted, our study revealed that as employees experienced more conflicting demands during an activity, they indeed felt less engaged. This finding is in line with previous research that defines demands as characteristics of the job that evoke strain, thus, having a negative impact on employee's wellbeing (Hakanen, Bakker, & Demerouti, 2005). For example, Tadić et al.'s (2014) diary study found that demands, such as role conflict, thwart goal achievement and undermine basic needs because they are not aligned with employees' interests and values, thus lowering workers' intrinsic motivation.

Surprisingly, workload was not related to engagement, however, this effect could be dependent on episodic resources. Principally, in the current study, we expected that demands would boost the effect of resources on engagement based on JD-R theory (Bakker & Demerouti, 2014). However, we only found one significant interaction between the resources and demands measured in this study out of ten possible interactions. We suspect that the majority of interactions were not significant at the episode level because it is conceivable that in order for demands to amplify the effects of resources on engagement, employees need longer time to interpret the demands as challenging. According to Kühnel, Sonnentag, and Bledow (2012), the stress caused by a demand is potential energy that can be transformed into action energy considering that the person has the resources to deal with the demand. Because of this transformation time, employees may take longer to recognize that job resources can be used to deal with demands. Currently, studies have shown that within a day when employees experience high challenge demands and resources, their engagement is higher than when employees experience low demands and resources (Kühnel et al., 2012; Tadić et al., 2014). However, it is also possible that this process takes less than a full day, perhaps a couple of hours. Unfortunately, the time scope used in our study is rather short, and a limitation of our data is that we had several missing values. Future studies should investigate whether there is a lagged effect of demands on the relationship between resources and engagement. This would mean that demands boost the effect of resources on engagement later in time (e.g., 2 or 4 hr later).

In regard to the significant interaction between task significance and workload, this resulted in an unexpected pattern. Specifically, a plot of the interaction effect using Preacher, Curran, and Bauer's (2006) online interactive tool showed that workload undermined the positive relationship between task significance and episodic engagement. In addition, the effect size of this interaction was very small. Therefore, the theoretical implication of this interaction may be limited.

Validity of Episodic Engagement

The results of this study support the convergent validity of episodic engagement by showing that general-level engagement is conceptually similar to the average of episodic engagement because it captures the states of vigor, dedication, and absorption. However, episodic engagement is different from general engagement in that it is not capturing the general feeling, but the short-lived episodic experience. This was implemented by the design of the questionnaires. The general questionnaire referred to the general experience of engagement and the momentary questionnaire referred to the experience of engagement during a specific activity. This means that even when an employee is overall highly engaged, (s)he can still experience moments that are less engaging. This may, for example, happen when an employee is involved in an activity with conflicting instructions. In addition, the relation between person-level engagement and episodic engagement implies that it is likely that people with higher levels of general engagement also more often experience episodic engagement across activities in comparison to employees with lower levels of general engagement.

In line with our predictions, engagement was positively related with performance and mediated the relations between episodic resources and demands, and performance. This finding can be understood in light of the episodic performance model. According to Beal et al. (2005), the more one invests one's energetic resources in a task, the better one's performance. This mechanism is termed self-regulation of attention and means that people channel different kinds of resources (e.g., cognitive abilities) toward the task in spite of the distractions that may be present. We think that engagement exhibits this self-regulation of attention toward an activity in employees putting more energy, enthusiasm, and concentration into an activity resulting in higher performance (see also, Hopstaken, van der Linden, Bakker, & Kompier, 2015). The current study's findings give evidence to this process by showing that the more episodic resources an employee has while performing an activity, the higher their engagement, resulting in improved activity performance.

Limitations

The first limitation of the present study concerns the reliance on only self-report measures, which may lead to common-method variance (CMV). However, the use of the ESM reduces memory bias, which increases the accuracy of what is being reported (Hektner et al., 2007). In addition, the relationships between the model variables found were moderate, suggesting that CMV was not a major threat in the present study.

Secondly, the relationships that were tested in the model captured synchronous effects, thus causal effects were not estimated. This means that future research considering lagged effects of episodic engagement is needed in order to make causal inferences and control for spillover effects of episodic resources and demands from the previous activity to the next.

Third, the use of single-item measures to represent the job characteristics subscales affected the reliability of our job resources measure, consequently leading to an underestimation of the interaction effects. Future studies may benefit from using more items to represent each subdimension of the job characteristics scale or focus on the effect of one subdimension on engagement to prevent burdening the participants.

Finally, there are some concerns regarding the generalizability of our findings. First, our sample was a relatively small convenience sample. However, our sample of 61 participants (resulting in 430 observations) is a sample size larger than 50 at the highest level, which according to Maas and Hox (2005) constitutes a sufficient sample size in order to obtain accurate estimates. Second, our sample had a response rate of 45%. However, we provided supplemental analysis to confirm that there were no significant differences in general and episodic engagement as well as on the background variables between the participants who dropped out from the study and those who remained. In addition, maximum likelihood method was used to deal with the missing data to decrease the possibility of biased results (Peugh & Enders, 2004). Third, participants worked a relatively typical work schedule from 9:00 a.m. until 5:00 p.m. and were highly educated. That being said, we believe our findings exhibit some degree of generalizability in this area, as participants worked with regular work schedules in a variety of industries and fields that required higher education.

Implications for Research and Practice

This study focused on the main effects of resources and demands on engagement. Future research should look at other possible moderators of the relationship between activity characteristics and engagement. For example,

episodic resources may have a stronger effect on engagement in the morning than in the afternoon due to recovery states changing from morning to afternoon. In the afternoon, people are more likely to be tired and have fewer personal resources (e.g., self-efficacy, energy) available to dedicate to their tasks. Furthermore, the present study only examined relations at the activity level. Future studies may simultaneously examine cross-level interaction effects in order to test how enduring experiences moderate relations at the episode level.

Overall, our research should be considered as the first step in understanding episodic changes in engagement, by integrating JD-R theory and the episodic performance model. In addition, the measure of episodic engagement was validated. Future research using the three-item scale to measure episodic engagement is justified. In conclusion, the present study shows that engagement levels fluctuate from activity to activity. For organizations, the findings of this study show that resources lead to an increase in engagement and performance. Thus, organizations should focus on providing employees with feedback, autonomy, and skill variety during their different work activities as these resources promote their engagement and performance immediately. More insight into other characteristics (e.g., social support) of work activities will help us to better understand when employees are engaged and show optimal performance.

References

- Bakker, A. B. (2014). Daily fluctuations in work engagement: An overview and current directions. *European Psychologist, 19*, 227–236. doi: 10.1027/1016-9040/a000160
- Bakker, A. B., & Bal, M. P. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology, 83*, 189–206. doi: 10.1348/096317909X402596
- Bakker, A. B., & Demerouti, E. (2014). Job demands – resources theory. In C. Cooper & P. Chen (Eds.), *Wellbeing: A complete reference guide* (pp. 37–64). Chichester, UK: Wiley-Blackwell.
- Bakker, A. B., & Oerlemans, W. G. M. (2011). Subjective well-being in organizations. In K. S. Cameron & G. M. Spreitzer (Eds.), *Handbook of positive organizational scholarship* (pp. 178–189). New York, NY: Oxford University Press.
- Beal, D. J., Weiss, H. M., Barros, E., & MacDermid, S. M. (2005). An episodic process model of affective influences on performance. *The Journal of Applied Psychology, 90*, 1054–1068. doi: 10.1037/0021-9010.90.6.1054
- Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 107*, 228–246. doi: 10.1037/0033-2909.107.2.238
- Crawford, E. R., Lepine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *The Journal of Applied Psychology, 95*, 834–848. doi: 10.1037/a0019364
- Daniels, K., Beesley, N., Wimalasiri, V., & Cheyne, A. (2013). Problem solving and well-being: Exploring the instrumental role

- of job control and social support. *Journal of Management*, 39, 1016–1043. doi: 10.1177/0149206311430262
- Daniels, K., Harris, C., & Briner, R. B. (2004). Linking work conditions to unpleasant affect: Cognition, categorization and goals. *Journal of Occupational and Organizational Psychology*, 77, 343–363. doi: 10.1348/0963179041752628
- Fisher, C. D., & Noble, C. S. (2004). A within-person examination of correlates of performance and emotions while working. *Human Performance*, 17, 145–168. doi: 10.1207/s15327043hup1702_2
- Hackman, J. R., & Oldham, G. R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Hakanen, J. J., Bakker, A. B., & Demerouti, E. (2005). How dentists cope with their job demands and stay engaged: The moderating role of job resources. *European Journal of Oral Sciences*, 113, 479–487. doi: 10.1111/j.1600-0722.2005.00250.x
- Hakanen, J. J., Perhoniemi, R., & Toppinen-Tanner, S. (2008). Positive gain spirals at work: From job resources to work engagement, personal initiative and work-unit innovativeness. *Journal of Vocational Behavior*, 73, 78–91. doi: 10.1016/j.jvb.2008.01.003
- Halbesleben, J. R. B. (2010). A meta-analysis of work engagement: Relationships with burnout, demands, resources, and consequences. In A. B. Bakker & M. P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 102–117). New York, NY: Psychology Press.
- Hektner, J. M., Csikszentmihalyi, M., & Schmidt, J. A. (2007). *Experience sampling method: Measuring the quality of everyday life*. Thousand Oaks, CA: Sage.
- Hopstaken, J. F., van der Linden, D., Bakker, A. B., & Kompier, M. A. J. (2015). The window of my eyes: Task disengagement and mental fatigue covary with pupil dynamics. *Biological Psychology*, 110, 100–106. doi: 10.1016/j.biopsycho.2015.06.013
- Ilies, R., Dimotakis, N., & De Pater, I. E. (2010). Psychological and physiological reactions to high workloads: Implications for well-being. *Personnel Psychology*, 63, 407–436. doi: 10.1111/j.1744-6570.2010.01175.x
- Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33, 692–724. doi: 10.2307/256287
- Kahn, R. L., Wolfe, D. M., Quinn, R. P., Snoek, J. D., & Rosenthal, R. A. (1964). *Organizational stress: Studies in role conflict and ambiguity*. New York, NY: Wiley.
- Kline, R. N. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford.
- Kühnel, J., Sonnentag, S., & Bledow, R. (2012). Resources and time pressure as day-level antecedents of work engagement. *Journal of Occupational and Organizational Psychology*, 85, 181–198. doi: 10.1111/j.2044-8325.2011.02022.x
- Maas, C. J., & Hox, J. J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology*, 1, 86–92. doi: 10.1027/1614-1881.1.3.86
- Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research: An introduction and some practical recommendations. *Journal of Personnel Psychology*, 9, 79–93. doi: 10.1027/1866-5888/a000009
- Peugh, J. L., & Enders, C. K. (2004). Missing data in educational research: A review of reporting practices and suggestions for improvement. *Review of Educational Research*, 74, 525–556. doi: 10.3102/00346543074004525
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). *Probing interactions in multiple linear regression, latent curve analysis, and hierarchical linear modeling: Interactive calculation tools for establishing simple intercepts, simple slopes, and regions of significance* [Computer software]. Available from <http://quantpsy.org/>
- Rodell, J. B., & Judge, T. A. (2009). Can “good” stressors spark “bad” behaviors? The mediating role of emotions in links of challenge and hindrance stressors with citizenship and counterproductive behaviors. *The Journal of Applied Psychology*, 94, 1438–1451. doi: 10.1037/a0016752
- Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior*, 25, 293–315. doi: 10.1002/job.248
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement*, 66, 701–716. doi: 10.1177/0013164405282471
- Selig, J. P., & Preacher, K. J. (2008). *Monte Carlo method for assessing mediation: An interactive tool for creating confidence intervals for indirect effects* [Computer software]. Available from <http://quantpsy.org/>
- Simbula, S. (2010). Daily fluctuations in teachers’ well-being: A diary study using the Job Demands-Resources model. *Anxiety, Stress, and Coping*, 23, 563–584. doi: 10.1080/10615801003728273
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25, 173–180. doi: 10.1207/s1532790mbr2502_4
- Streiner, D. L. (2005). Finding our way: An introduction to path analysis. *Canadian Journal of Psychiatry*, 50, 115–122. doi: 10.1177/070674370505000207
- Tadić, M., Oerlemans, W. G. M., & Bakker, A. B. (2014). *How challenging was your work today? A diary study on challenge and hindrance job demands and work-related well-being*. Manuscript submitted for publication.
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1–10. doi: 10.1007/BF02291170
- Valkeneers, G., Bossaert, C., & Buys, I. (2011). Het taakkenmerken model. Een update en empirische toets van het hernieuwde model [The job characteristics model. An update and empirical test of the renewed model]. *Over.Werk. Tijdschrift van Het Steunpunt WSE*, 21, 69–74.
- Xanthopoulou, D., & Bakker, A. B. (2013). State work engagement: The significance of within-person fluctuations. In A. B. Bakker & K. Daniels (Eds.), *A day in the life of a happy worker* (pp. 25–40). Abingdon, UK: Psychology Press.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational Behavior*, 74, 235–244. doi: 10.1016/j.jvb.2008.11.003

Received May 10, 2016

Revision received October 7, 2016

Accepted October 11, 2016

Published online March 10, 2017

Andrea M. Reina-Tamayo

Erasmus University Rotterdam
Department of Work and Organizational Psychology
Woudestein, Medeville Building (T)16-18
P.O. Box 1738
3000 DR Rotterdam
reinatamayo@fsw.eur.nl