Do job demands, job resources and personality predict burnout and work engagement? A two-sample study

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Submitted

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Abstract

Objective
The principal objective of this study is to demonstrate that, as hypothesised in the Job Demands-Resources (JD-R) model, job demands and lack of job resources predict future burnout, whereas job resources predict future work engagement. Second, we investigate the extent to which personality adds to this prediction. Finally, we evaluate the short-term (one-year) and long-term (two-year) effects of combinations of job characteristics and personality traits on burnout and work engagement.

Methods
Longitudinal data were gathered from two independent groups (n = 201 and n = 151) of middle managers and executives from a Dutch telecoms company, who participated in an extensive survey on employee health and well-being. Hierarchical multiple regression analyses were carried out in order to test our hypotheses and identify relevant predictors.

Results
As hypothesised, job demands, especially work-home interference and emotional demands, and lack of job resources, especially opportunities to learn and autonomy, predict future levels of burnout. Moreover, job resources, especially social support, opportunities to learn, and autonomy, predict future levels of engagement. Neuroticism predicts both burnout (positive) and engagement (negative), whereas extraversion also predicts engagement (positive) and the burnout component of exhaustion (negative). Finally, as expected, the predictive effects are more powerful across the shorter time period of one year than across the longer time period of two years.

Conclusions
Our findings support the JD-R model, and suggest that the model should be supplemented with personality traits in order to increase its predictive power. Furthermore, the predictions also hold after a relatively long time interval of two years.

Keywords: job demands-resources (JD-R) model, predictor, personality, occupational health, health surveillance.
Introduction

Our principal objective in this study is to demonstrate that job demands and lack of job resources predict future burnout, whereas job resources predict future work engagement. Second, we investigate the extent to which personality adds to this prediction, the expectation being that neuroticism predicts burnout, whereas extraversion predicts work engagement. The predictive power of the combination of job characteristics and personality traits is also examined. Finally, two studies using similar samples but different time intervals allow us to evaluate the short-term (one-year) and long-term (two-year) effects of combinations of job characteristics and personality traits on burnout and work engagement.

We use the Job Demands-Resources (JD-R) model (Demerouti 2001b; Schaufeli and Bakker 2004) as the theoretical framework for this study. Although this model has been used in at least a dozen studies (Bakker and Demerouti 2007), virtually all of the existing studies are cross-sectional in nature, meaning that a rigorous longitudinal test remains an important undertaking. Moreover, the JD-R model does not include personality characteristics. So instead of merely replicating previous results, the current study goes beyond previous JD-R research in that it includes personality traits and predicts future burnout and work engagement.

The field of occupational and environmental health has traditionally focused on health complaints, injury, disorder or disease, accidents, and disability. Since its emergence in the mid-1970s, burnout has been a much-studied topic among both practitioners and researchers. The term ‘burnout’ originally referred to exhaustion, depersonalisation and reduced personal accomplishment as a syndrome manifest among those doing ‘people work’ of some kind (Maslach and Schaufeli 1993). The concept has subsequently been extended to include other professionals and occupational groups (Taris et al. 1999; Schutte et al. 2000), whereby its three dimensions – exhaustion, cynicism and professional efficacy – have been broadened to encompass both social as well as non-social aspects of employment. Its scope was recently extended even further by research focusing on ‘work engagement,’ the presumed opposite of burnout (Schaufeli and Bakker 2004; Demerouti et al. 2001a; Schaufeli et al. 2002a). Work engagement is defined as a positive, fulfilling, work-related state of mind that is characterised by vigour (high levels of energy while working, willingness to invest effort...
in work, and persistence in the face of difficulties); dedication (a sense of enthusiasm, inspiration, pride, and challenge); and absorption (the ability to concentrate and happily engross oneself in one’s work, whereby time passes quickly and one has difficulty detaching oneself from work). Just as exhaustion and cynicism are considered to constitute the ‘core of burnout’ (Green et al. 1991; Schaufeli and Taris 2005), vigour and dedication are the core dimensions of work engagement (Bresó et al. 2007). In particular, exhaustion and cynicism are the direct opposites of vigour and dedication, respectively (González-Romá et al. 2006). This is not to suggest, however, that the antecedents of burnout (exhaustion and cynicism) are similar but inverse to those of work engagement (vigour and dedication).

Research using the JD-R model (Bakker and Demerouti 2007) has shown that burnout and work engagement relate differently to job characteristics. Work engagement is positively related to job resources, such as social support from colleagues, autonomy, supervisory coaching, opportunities for learning and development, and performance feedback (Schaufeli and Bakker 2004; Bakker et al. 2003c; Hakanen et al. 2006; Llorens et al. 2006). The term ‘job resources’ refers to those physical, psychological, social or organisational aspects of a job that reduce job demands, are functional in achieving work goals, and stimulate personal growth, learning and development (Demerouti et al. 2001b; Demerouti et al. 2001a). Job resources are thus not only necessary for dealing with job demands and ‘getting things done,’ but they also are important in their own right due to their motivating potential (Hobfoll 2002). Job resources may play either an intrinsic motivational role (fostering employees’ growth, learning and development), or an extrinsic motivational role (being instrumental in dealing with job demands and achieving work goals). Not surprisingly, then, job resources are – via work engagement – related to organisational commitment, intention to stay and sickness absence (Schaufeli and Bakker 2004; Bakker et al. 2003a). A motivational process thus seems to exist, whereby work engagement plays a mediating role between job resources and positive organisational outcomes. Four job resources were included in the current study, owing to their special relevance to the managers studied: social support from colleagues, job control, opportunities to learn and develop, and performance feedback.

In addition to a motivational process, the JD-R model assumes a health impairment process that may be evoked by job demands (Bakker and
Demerouti 2007; Bakker et al. 2003b). The term ‘job demands’ refers to aspects of a job that require sustained physical and psychological effort. Job demands are not necessarily negative, but when the efforts demanded exceed an employee’s capabilities, the latter’s energy is drained and burnout and subsequent health problems are likely to follow (Schaufeli and Bakker 2004; Demerouti et al. 2001a; Hakanen et al. 2006; Llorens et al. 2006). In addition to job demands, poor resources also play a role in the health impairment process, albeit that the association of job demands with burnout is usually much stronger than that of poor resources (Schaufeli and Bakker 2004; Hakanen et al. 2006). Four job demands were included in the current study, due to their special relevance to the managers studied: work overload, emotional demands, cognitive demands, and work-home interference.

The sceptical reader might question whether the associations between job characteristics (that is, demands and resources) and employee wellbeing (that is, burnout and engagement) may be confounded by the employees’ personalities, resulting in so-called information bias. It is possible that certain personality traits may render an employee more vulnerable or more resilient to job demands, or more liable or predisposed to the impact of job resources. Swickert et al. (2002), for instance, demonstrated that positive correlations exist between extraversion and perceived availability of support, enacted support and social network characteristics. In a study using a multi-level design, Griffin (2001) found that the proportion of between-group variance in job satisfaction increased when neuroticism and extraversion were included in the analysis. On a slightly different note, Scollon and Diener (2006) showed in a longitudinal study that increased work satisfaction was accompanied by decreases in neuroticism and increases in extraversion over time. In a similar vein, Langelaan et al. (2006) reported that high levels of neuroticism are positively related to burnout, whereas neuroticism is negatively related and extraversion is positively related to work engagement. The former result has been obtained in a number of other studies (Cano et al. 2005; Mills and Huebner 1998; Zellars et al. 2004).

Despite the impressive volume of publications on burnout and the growing number of publications on engagement, three issues remain unresolved. First, virtually all research on burnout and work engagement that uses the JD-R model has been cross-sectional in nature, so that no causal inferences can be made. Second, the ‘Big Two’ personality characteristics
(neuroticism and extraversion) have not been added or integrated into the JD-R model so far. Third, most longitudinal studies use only one time interval, so that longitudinal effects cannot be compared with longer or shorter time intervals in other studies. Little information is available concerning the amount of time that is needed for job characteristics to influence employee well-being (Taris and Kompier 2003). As a result, recommendations concerning length of follow-up in etiological studies are inconsistent (De Lange et al. 2003). The current study addresses these issues by using a longitudinal design with two time intervals of one and two years, respectively. Moreover, in addition to job characteristics (demands and resources), neuroticism and extraversion are included as independent variables in order to explain future employee well-being (burnout and work engagement).

More specifically, we hypothesise that:

1. Job demands (that is, work overload, emotional demands, cognitive demands, and work-home interference) and a lack of job resources (that is, autonomy, opportunities to learn, performance feedback and social support) predict future burnout.

2. Job resources (that is, autonomy, opportunities to learn, performance feedback and social support) predict future work engagement.


4. Extraversion (positively) and neuroticism (negatively) predict future engagement.

5. The effects of hypotheses 1-4 are stronger for the shorter, one-year time period than for the longer, two-year time period.

Method

Samples

The study, which was profiled as an extensive employee health and well-being survey, was carried out among two independent groups of middle managers and executives of a Dutch telecoms company. These two samples were invited to participate in the study during two consecutive periods.

Sample 1. At Time 1 (T1), a total of 420 employees were invited to participate (response rate 85%; N = 355). One year later, at Time 2 (T2), 17 respondents had dropped out due to turnover and pensioning. As a result,
338 managers and executives were invited to participate in the follow-up (response rate 59%; N = 201). Hence, 57% (201/355) of the initial sample was included.

Sample 2. At the same time as T2 of Sample 1, a second group of 702 managers was invited to participate (T1; response rate 64%; N = 450). At follow-up two years later, 170 managers had dropped out due to a large, ongoing reorganisation process that had prompted turnover, outplacements and early pensioning. As a result, after two years (T2), 280 managers were approached (response rate 54%; N = 151). Hence, 36% (151/420) of the initial sample was included.

The majority of participants in Samples 1 and 2 are male (90% and 87%, respectively). For Sample 1, about 90% live with a partner, 56% hold at least a college degree, 35% completed vocational training, and 7% attended secondary school only. The mean age of Sample 1 is 42.9 years (SD = 7.9), and on average, the managers have worked 18.4 years for the company (SD = 10.7), but only 1.9 years (SD = 2.3) in their current jobs.

For Sample 2, about 87% live with a partner, 78% hold at least a college degree, 15% completed vocational training, and 4% visited secondary school only. The mean age of Sample 2 is 42.0 years (SD = 7.0), and on average, the managers have worked 15.2 years for the company (SD = 9.6), but only 2.3 years (SD = 1.8) in their current jobs.

Our research thus uses a typical managerial sample consisting of predominantly middle-aged and married men. The level of education is high (that of Sample 2 being significantly higher than that of Sample 1; $\chi^2 (7) = 52.7$, $p = .00$), and the employees have spent a significant number of years working for the company (for Sample 1, this time is notably shorter than for Sample 2; $p = .00$). In contrast, the time that they have spent in their current jobs is short (Sample 1 significantly shorter than Sample 2; $p = .00$).

Selective dropout over time for Sample 1 was observed for age and duration of employment in the company. Compared to the drop-outs, the participants at T2 were slightly older ($M = 44.4$ versus $M = 41.0$; $t(349) = 3.96$; $p = .000$) and had been employed for longer ($M = 19.9$ versus $M = 16.4$; $t(351) = 3.10$; $p = .002$). This might be due to the fact that older managers are more loyal towards the organisation (Patel 1999) and keener to participate in the
survey. No selective dropout was found for gender, mode of cohabitation, level of education, and work experience in the current job.

Selective dropout for Sample 2 was only observed for gender. Comparing T1 and T2, the percentage of men was significantly higher (93% versus 87%; $\chi^2(1) = 6.84, p = .00$). No selective dropout was observed for the other demographics.

**Procedure**

All participants received a questionnaire with an accompanying letter from an independent occupational health service, which invited them to participate in the health and well-being survey, explained its purpose, guaranteed confidentiality, and emphasised that participation was voluntary. Participants were asked to complete the questionnaire and to return it to the occupational health service.

**Measures**

*Job resources.* The survey included various (shortened) scales from the Questionnaire on the Experience and Evaluation of Work (QEEW), which is widely used by the Dutch occupational health services and also by researchers (Van Veldhoven and Meijman 1994; Van Veldhoven et al. 2002; Van Veldhoven and Broersen 2003). More specifically, four job resources were assessed: social support from colleagues (three items; $\alpha_{S1T1} = .86; \alpha_{S1T2} = .86; \alpha_{S2T1} = .86; \alpha_{S2T2} = .84$); job control (three items; $\alpha_{S1T1} = .78; \alpha_{S1T2} = .80; \alpha_{S2T1} = .70; \alpha_{S2T2} = .72$); opportunities to learn and develop (four items; $\alpha_{S1T1} = .87; \alpha_{S1T2} = .84; \alpha_{S2T1} = .82; \alpha_{S2T2} = .85$); and performance feedback (three items; $\alpha_{S1T1} = .84; \alpha_{S1T2} = .81; \alpha_{S2T1} = .79; \alpha_{S2T2} = .79$). Examples of items include: 'If necessary, can you ask your colleagues for help?' (social support); 'Do you have freedom in carrying out your work activities?' (autonomy); 'Do you learn new things in your work?' (opportunities to learn and develop); 'Does your work provide you with direct feedback on how well you are doing?' (performance feedback).

*Job demands.* Using the QEEW, the following job demands were assessed: work overload (five items; $\alpha_{S1T1} = .84; \alpha_{S1T2} = .84; \alpha_{S2T1} = .84; \alpha_{S2T2} = .87$), emotional demands (three items; $\alpha_{S1T1} = .72; \alpha_{S1T2} = .76; \alpha_{S2T1} = .80; \alpha_{S2T2} = .80$), and cognitive demands (five items; $\alpha_{S1T1} = .75; \alpha_{S1T2} = .79; \alpha_{S2T1} = .72; \alpha_{S2T2} = .81$). In addition, work-home interference was measured according to the scale developed by Peeters et al. (2004) (seven items; $\alpha_{S1T1} = .85$);
$\alpha_{S1T1} = .89; \alpha_{S1T2} = .89; \alpha_{S2T1} = .91$). Examples of items include: ‘Do you have to work very fast?’ (work overload); ‘Does your work put you in emotionally upsetting situations?’ (emotional demands); ‘Does your work demand a lot of concentration?’ (cognitive demands); ‘How often does it occur that you have so much to do at work that you cannot fulfil duties at home?’ (work-home interference). All items assessing job resources and job demands were scored on a 5-point rating scale ranging from 1 (‘never’) to 5 (‘always’).

**Work engagement** was assessed according to two scales from the Utrecht Work Engagement Scale (UWES) (Schaufeli et al. 2002b): vigour (six items; $\alpha_{S1T1} = .81; \alpha_{S1T2} = .86; \alpha_{S2T1} = .83; \alpha_{S2T2} = .81$) and dedication (five items; $\alpha_{S1T1} = .91; \alpha_{S1T2} = .91; \alpha_{S2T1} = .89; \alpha_{S2T2} = .92$). Example of items include: ‘At work, I feel like I am bursting with energy’ (vigour), and ‘I find that the work that I do is full of meaning and purpose’ (dedication). All items were scored on a seven-point scale ranging from 0 (‘never’) to 6 (‘always’).

**Burnout** was assessed according to two scales from the Dutch version (Schaufeli and Van Dierendonck 2000) of the Maslach Burnout Inventory-General Survey (MBI-GS) (Schaufeli et al. 1996): exhaustion (five items; $\alpha_{S1T1} = .87; \alpha_{S1T2} = .85; \alpha_{S2T1} = .85; \alpha_{S2T2} = .88$) and cynicism (five items: $\alpha_{S1T1} = .77; \alpha_{S1T2} = .78; \alpha_{S2T1} = .77; \alpha_{S2T2} = .83$). Example of items include: ‘Working all day is really a strain for me’ (exhaustion), and ‘I have become less interested in my work since I started this job’ (cynicism). The burnout items were scored in the same way to those of work engagement.

**Personality:** The two personality dimensions, extraversion and neuroticism, were assessed according to the Dutch version (Hoekstra et al. 1996) of the Neo-Five Factor Inventory (NEO-FFI) (Costa and McCrae 1992). This had 12 items for both extraversion (for example, ‘I really like to talk to people’; $\alpha_{S1T1} = .77; \alpha_{S1T2} = .78; \alpha_{S2T1} = .80; \alpha_{S2T2} = .79$) and neuroticism (for example, ‘I often feel tense and nervous’; $\alpha_{S1T1} = .83; \alpha_{S1T2} = .77; \alpha_{S2T1} = .81; \alpha_{S2T2} = .82$). Items were scored on a 5-point scale ranging from 1 (‘totally disagree’) to 5 (‘totally agree’). According to the Dutch manual (Hoekstra et al.1996), the NEO-FFI’s psychometric properties (such as construct validity, for example) are sufficient.

The internal consistencies of all scales meet the criterion of .70, a value that is used as a general indication for sufficient reliability (Nunally and Bernstein 1994).
Analyses
Hierarchical multiple regression analyses were carried out in order to test our hypotheses and to identify relevant T1 predictors (job resources, job demands and personality) of T2 engagement (vigour and dedication) and burnout (exhaustion, and cynicism), respectively. To control for the effects of demographics, Step 1 of the analyses included age, gender, education, and work experience. Next, in Step 2, job characteristics (demands and resources) were added to the regression model; and in Step 3 personality traits (extraversion and neuroticism) were added. In order to explore possible interactions between job characteristics and personality, all 12 interaction terms were added to the regression model in Step 4. Finally, to assess the effects of baseline levels, in Step 5, the managers’ T1 scores on vigour, dedication, exhaustion, and cynicism were included in the respective analyses.

Results
The means, standard deviations, and correlations for all study variables for both samples are displayed in Table 1. Scores on the burnout and work engagement scales are relatively stable across time, with test-retest correlations ranging from .63 to .75 across a one-year interval (Sample 1), and ranging from .53 to .63 across a two-year interval (Sample 2).

The results of the four stepwise hierarchical multiple regression analyses are summarised in Tables 2 and 3, for Sample 1 and Sample 2, respectively. As can be seen from Table 2, vigour at T2 (Sample 1) is predicted by work experience, social support, neuroticism and extraversion at T1 (Step 4). That is, the shorter period of the manager’s work experience, the more social support he receives from his colleagues, the lower he scores for neuroticism, the higher for extraversion, and the more vigorous he feels one year later. Taken together, the T1 predictors explain 30% of the variance of T2 vigour. After vigour at T1 has been introduced in the final step of the original predictors, however, only the effects of work experience and social support remain significant. Finally, 58% of the variance in T2 vigour is explained, of which 28% is accounted for by T1 vigour.

Dedication at T2 (Sample 1) is predicted by opportunities to learn, a lack of work-home interference, social support, and low neuroticism, explaining
27% of the variance. After introducing T1 dedication in step five, only the negative effect of work-home interference remains significant. In total, 44% of the variance of T2 dedication is explained after T1 dedication is included in the regression equation, an increase of 17%.

Exhaustion at T2 (Sample 1) is predicted by work-home interference and extraversion, which together explain 23% of the variance. Having introduced T1 exhaustion, however, both significant effects disappear, leaving only T1 exhaustion as a significant predictor that explains 45% of the variance.

### Table 1. Means (M), standard deviations (SD) and inter-correlations among the study variables of Sample 1 (n=201/below diagonal) and Sample 2 (n=151/above diagonal).

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Table 2: Stepwise hierarchical regression analysis of Sample 1 (n=201); Step 1 demographics (age, gender, education, work experience), Step 2 job characteristics (demands and resources), Step 3 personality traits (extraversion and neuroticism), Step 4 interaction terms (job characteristics and personality), Step 5 T1 scores of outcome data (vigour, dedication, exhaustion, cynicism).

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1 Cynicism male 1.02 / Cynicism female 1.57
Cynicism at T2 (Sample 1) is predicted by gender (female), work-home interference, lack of learning opportunities, neuroticism, and the interaction between work-home interference and neuroticism, which together explain 31% of the variance. After T1 cynicism has been introduced in the final step, however, only the effect of gender (female) and work-home-
interference remains significant, explaining 44% of the variance. Figure 1 displays the interaction effect and shows how neuroticism exacerbates the impact of work-home interference on cynicism. That is, when work-home interference is high, those managers with high levels of neuroticism feel particularly cynical.

As can be seen from Table 3, vigour at T2 (Sample 2) is predicted by opportunities to learn, autonomy, extraversion and low neuroticism, explaining 29% of the variance. After introducing T1 vigour in the final step, only the effects of autonomy and extraversion remain significant. In total, 37% of the variance in T2 vigour is explained, of which 8% is accounted for by vigour at T1.

Dedication at T2 (Sample 2) is predicted by opportunities to learn, autonomy and low neuroticism, explaining 24% of the variance. After the introduction of dedication at T1, only autonomy remains in the model. Dedication at T1 and autonomy both explain 35% of the variance of dedication at T2, 11% added by dedication at T1.

![Figure 1. Cynicism at T2 (Sample 1) predicted by the interaction between work-home interference and neuroticism. Neuroticism exacerbates the impact of work-home interference on cynicism (n=151). WHI = low & Neurot = low -> Cynicism = 0.63; WHI = high & Neurot = low -> Cynicism = 0.92; WHI = low & Neurot = high -> Cynicism = 1.01; WHI = high & Neurot = high -> Cynicism = 1.66](image-url)
Exhaustion at T2 (Sample 2) is predicted by work-home interference, lack of autonomy and neuroticism, explaining 18% of the variance. After introducing T1 exhaustion in the final step, all other significant effects disappear. T1 exhaustion accounts for 41% of the variance of exhaustion of T2.

Cynicism at T2 (Sample 2) is predicted by emotional demands and the lack of opportunities to learn, explaining 12% of the variance. The introduction of T1 cynicism leaves only the effect of emotional demands, explaining 30% of the variance.

Table 4 summarises the results of the eight regression analyses and allows us to evaluate our hypotheses. Hypothesis 1, which states that burnout is predicted by job demands and lacking job resources, is confirmed, at least as far as some demands and resources are concerned. Work-home interference (Samples 1 and 2) and emotional demands (Sample 2) predict exhaustion and cynicism, albeit that the effect of work-home interference on exhaustion in Sample 1 disappears after controlling for exhaustion at baseline. In a similar vein, a lack of opportunities to learn (Samples 1 and 2) and a lack of autonomy (Sample 2) predict exhaustion and cynicism, but this effect disappears after controlling for baseline burnout levels.

Hypothesis 2, which states that engagement is predicted by job resources, is partly confirmed. Before introducing baseline vigour and dedication,
we find that social support (Sample 1), opportunities to learn (Samples 1 and 2) and autonomy (Sample 2) predict T2 vigour and dedication. After controlling for baseline engagement levels, the effect of learning opportunities disappears. Unexpectedly, work-home interference negatively predicts T2 dedication (Sample 1).

Hypothesis 3, which states that neuroticism predicts burnout, is confirmed as far as exhaustion (Sample 2) and cynicism (Sample 1) are concerned, but only when not controlled for baseline levels. Unexpectedly, extraversion predicts exhaustion negatively (Sample 1), but again, this is only the case when not controlled for baseline levels.

Hypothesis 4, which states that engagement is predicted by extraversion and low neuroticism, is confirmed. Neuroticism has a negative impact on vigour and dedication (Samples 1 and 2), but only when not controlled for baseline levels. Extraversion predicts vigour in both samples, but only in Sample 2 does the effect remain significant after controlling for baseline level.

Hypothesis 5, which states that the effects of the previous hypotheses are stronger for Sample 1 than for Sample 2, is confirmed, both in terms of the number of significant effects (see Table 4) as well as in terms of percentages-explained variance (see Tables 2 and 3). Thus as expected, predictions across a one-year period were more numerous and stronger than those across a two-year period.

**Discussion**

The aim of the current study was to demonstrate that, in line with the JD-R model, the presence of job demands and the absence of job resources predict future burnout, whereas the presence of job resources predicts future work engagement. Furthermore, we aimed to evaluate the additional predictive power of two personality traits (neuroticism and extraversion). Finally, we aimed to compare predictions across two different time periods (one and two years).

As expected and as stated in Hypothesis 1, job demands (especially work-home interference and emotional demands) and lack of job resources
especially opportunities to learn and autonomy) predict future levels of burnout (exhaustion and cynicism). Also as expected (Hypothesis 2), our results demonstrate that job resources, especially social support, opportunities to learn, and autonomy, predict future levels of engagement (vigour and dedication). In addition, we made the unexpected finding that work-home interference negatively predicts future dedication. Moreover, the observed effects of personality on future burnout (Hypothesis 3) and engagement (Hypothesis 4) largely corresponded with our expectations. That is, neuroticism predicts both burnout (positive) and engagement (negative), whereas extraversion also predicts engagement (positive). One exception is the unexpected finding that extraversion negatively predicts future exhaustion, which can be explained by pointing to the fact that energy is considered to be a facet of extraversion (Costa and McCrae 1992).

Finally, and also as expected, the predictive effects that were specified in Hypotheses 1-4 are more powerful across the shorter time interval of one year (Sample 1) than across the longer time interval of two years (Sample 2). Nevertheless, however, the percentage of explained variance in burnout and engagement remains relatively high, even after two years; on average, 20% without controlling for baseline, and 35% after controlling for baseline. For the shorter time period of one year, these rates are 27% and 47%, respectively.

Taken together, our findings support the JD-R model (Hypotheses 1 and 2) and suggest that the model should be supplemented with personality traits (Hypotheses 3 and 4) in order to increase its predictive power. Despite the fact that our results are generally in line with expectations, however, some unexpected findings warrant further discussion.

First, according to our study, work overload does not predict future burnout. This finding does not agree with the health impairment process in the JD-R model, which states that job demands may lead to mental exhaustion. Nevertheless, as for other studies (Schaufeli and Bakker 2004; Bakker et al. 2005; Santavirta et al. 2007), relatively strong cross-sectional correlations between work overload and exhaustion were found: $r = .50$ and .51 for Sample 1 and Sample 2, respectively. Instead of T1 work overload, however, other demands such as work-home interference and emotional demands predict T2 burnout. This might be partly caused by the
overlap between the various job demands. For instance, the correlations between workload and work-home interference are relatively substantial ($r = .49$ and $.51$ for Sample 1 and Sample 2, respectively), as are those between workload and emotional demands ($r = .48$ and $.39$ for Sample 1 and Sample 2, respectively). As far as work-home interference is concerned, this finding is compatible with the Effort-Recovery theory (Meijman and Mulder 1998), which assumes that job demands will lead to fatigue and eventually exhaustion when recovery from the efforts is insufficient. In the case of work-home interference, job stress spills over into other life domains, thereby simultaneously undermining recovery from work and fostering exhaustion. It can thus be speculated that instead of work overload, poor recovery from work is predictive of burnout.

The second issue to address is the finding that feedback, being a job resource, does not predict engagement. This contrasts with the findings of Llorens et al. (2006), which suggest that the motivational process of the JD-R model starts with job resources, including feedback, leading to work engagement and consequently to high levels of organisational commitment. According to Bakker et al. (2006), feedback may play an intrinsic motivational role because it fosters employees’ growth, learning and development, thereby increasing job competences. The overlap between feedback and ‘opportunities to learn’ is therefore not surprising, and is underscored by high inter-correlations with this variable ($r = .51$ and $.42$ for Sample 1 and Sample 2, respectively). This overlap might explain why opportunities to learn, rather than feedback, predict work engagement.

A third issue concerns the (in)consistency of the results across Sample 1 and Sample 2. The short-term (one year) outcome of burnout was mainly related to gender, lack of opportunities to learn, work-home interference, neuroticism, and low levels of extraversion. For engagement, short-term relationships were demonstrated for work experience, social support, opportunities to learn, low levels of neuroticism and extraversion. Some of these variables, in particular lack of opportunities to learn, work-home interference and neuroticism (all for burnout), and opportunities to learn, extraversion and low levels of neuroticism (all for engagement), also influenced long-term outcomes (two years). Not much is known about the length of time that is needed for job characteristics to have an effect on employees’ health and well-being (Taris and Kompier 2003),
and the recommendations arising from research on the length of this
time period are inconsistent. De Lange et al. (2003) therefore suggest
considering the choice of a particular time period based on interim
effects (did a manager change his/her job?), maturation effects (is there
more exposure during a certain period?) and seasonal effects (is it spring
or autumn?). In our study, selection of time intervals was mainly due to
practical concerns and arrangements made with the employer. Although
the fact that we opted for a one- and two-year follow-up period means
that seasonal effects can be virtually discounted, interim and maturation
effects cannot be ruled out. We can nevertheless conclude that a short-
term prediction is possible for demographics (such as work experience
and gender) and social support in particular, whereas for other variables
selected during the hierarchical regression analysis, prediction of long-
term effects may be useful.

A fourth issue concerns the evaporation of some predictive variables
after the introduction of the dependent variable at baseline T1 into the
regression model. This phenomenon is most pronounced for exhaustion
– no predictive variables are left after T1 exhaustion is introduced – but
was also observed for the other dependent variables. The reason for this
is that all dependent variables have relatively high stabilities, with test-
retest coefficients ranging between .63 and .75, and between .53 and
.63 (Table 1), for the one-year and a two-year time periods respectively.
Such levels of stability leave little scope for other predictors to have a
significant effect.

Taris et al. (1999) also report similar strong longitudinal associations,
usually referred to as ‘stability effects’ or ‘autocorrelations’. In Taris et
al.’s study, workers exhibiting relatively high levels of exhaustion
(depersonalisation/personal accomplishment) also reported high levels
of exhaustion (depersonalisation/personal accomplishment) at a later
stage, seemingly irrespective of the length of the time-interval between
study waves. In her thesis, Hallberg (2006) offers two interpretations of
this phenomenon. Her first suggestion is that, following Kanungo (1979)
and Hobfoll (1998), a large amount of variance in burnout is explained
by personality factors, and only a small part of the variance is left for
contextual variables. A second possible interpretation can be found in
Zapf et al.’s (1996) model, which suggests that strain occurs following
accumulated exposure to a stressor that leads to further increase in the
stress response, even after the stressor has been removed. A period of high work stress can thus correspond with no experience of burnout, but tipped over the edge high work stress will maintain burnout reactions for a long time.

It is possible that both are (partially) true, and that in our study, the stability of the dependant variables might have masked the impact of correlated independent variables. The introduction of the strong predictor, exhaustion, at baseline during the last step of the regression analysis could have masked the impact of neuroticism on the future development of exhaustion, with its consecutive practical implications. One practical implication, for instance, is that identification of employees with a high neuroticism score might still constitute a good way to start preventing exhaustion. This might be an appropriate approach for when jobs are still ‘virtual,’ as in case of an assessment situation and the consequent provision of support to applicants. A second implication is that other arguments might be used to guide the choice of intervention. For example, a company might consider the introduction of more learning opportunities to be a more attractive option than direct attempts to change employees’ dedication levels.

The final issue that we would like to address concerns the interaction between work-home interference and neuroticism. Managers who suffer from work-home interference are particularly likely to feel cynical when they score high for neuroticism. This finding is in line with the research carried out by Langelaan et al. (2006), which found that high neuroticism is a core characteristic of burnout. Neuroticism reflects stress sensibility (Suls 2001) and is therefore a vulnerability factor for managers. ‘Neurotic’ managers perceive their work environment to be more threatening, which in turn is likely to lead to more negative emotions and poor performance (Schneider 2004). Moreover, for these managers, the negative effect of job demands on burnout is stronger. Bolger and Schilling (1991) describe a tendency to experience more exhaustion in exposure and reactivity to daily stressors. This fact, combined with the findings of van Hooff et al. (2006) that (strain-based) work-home interference acts as a precursor of health impairment, may explain the interaction of work-home interference and neuroticism. In other words, those employees scoring high for neuroticism are more vulnerable to work-home interference.
The current study also has some limitations. First, data were obtained by means of self-report questionnaires, and the findings may be contaminated by common method variance as a result. Some researchers have found that this method of measurement results in bias, which can lead to inaccurate measures of usage and relationships with other constructs (Delone and McLean 2003). In this respect, further research into more ‘objective’ behavioural measures, such as absenteeism and work performance as results of burnout and engagement, might be helpful. In addition, both samples mostly consisted of male employees of a telecoms company. One therefore has to be careful with regard to generalisation of the results. Despite these limitations, however, the present study has a number of strong points: a longitudinal design, two different samples, two different time intervals, and the introduction of the ‘Big Two’ personality factors into the design.

In conclusion, our findings largely support the JD-R model, and suggest that the model should be supplemented with personality traits in order to increase its predictive power.

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