Do Type D personality and job demands-resources predict emotional exhaustion and work engagement? A 3-wave prospective study

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Abstract

Cross-sectional studies suggest that Type D personality is a risk factor for work-related exhaustion and engagement, but longitudinal evidence is lacking. The present 3-wave study examined its longitudinal effects, taking into account existing job demands and resources, exhaustion, engagement, and neuroticism. Data were extracted from the LISS-panel, based on a random sample of the Dutch population. Hierarchical multiple regression analyses were conducted among respondents (N=2273) who were employed during the 7-month study. Respondents worked in sectors varying from healthcare to industry. In the longitudinal analyses Type D personality was not a significant predictor for exhaustion/engagement over and above existing exhaustion/engagement, neuroticism, job demands and resources, in contrast to cross-sectional analyses. Job demands and resources explained a trivial proportion of variance of exhaustion and engagement in longitudinal analyses. Using the two elements of Type D personality (negative affectivity and social inhibition) did not change main findings. Existing exhaustion and engagement were significant and dominant predictors. We found no evidence to prove that Type D personality is relevant in the development of emotional exhaustion and engagement. Findings stress the necessity of longitudinal studies

controlling for corresponding variables assessed earlier to prevent overestimations of effects.

1. Introduction

The Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2007) is the most popular framework in occupational health psychology to investigate the relationships between these job characteristics and employee well-being (Lesener, Gusy, & Wolter, 2019). It distinguishes two broad categories of antecedent factors, namely job demands and job resources. The model represents an all-encompassing theoretical framework that may be applied to all occupational environments and is used to explain both positive and negative work outcomes. The most important of these work outcomes are burnout and work engagement, which are investigated most often by the JD-R approach (Schaufeli & Taris, 2014).

The present research will focus on emotional exhaustion and work engagement. Emotional exhaustion is characterized by the feeling of being emotionally overextended and worn out by one's work. It can be considered as the core component of burnout since the other dimensions (i.e., cynicism and reduced personal accomplishment) develop as a consequence from this state of exhaustion (Taris, Le Blanc, Schaufeli, & Schreurs, 2005). Work engagement is defined as "a positive, fulfilling, work-related state of mind that is characterized by vigour dedication, and absorption" (Schaufeli, Salanova, González- Romá, & Bakker, 2002, p.74).

1.1. Inclusion of personality traits in the JD-R model

A more recent addition to the JD-R model are personal resources defined as positive self-evaluations or psychological characteristics or traits (Schaufeli & Taris, 2014). These have similar motivational potential to that of job resources and are thought to be positively associated with work engagement and negatively related to burnout (Bakker, Demerouti, & Sanz-Vergel, 2014). The relationship between personality traits and both burnout and work engagement has been confirmed by several meta-analyses (Alarcon, Eschleman, & Bowling, 2009; Bakker et al., 2014; Mäkikangas, Feldt, Kinnunen, & Mauno,2013; Swider & Zimmerman, 2010; You, Huang, Wang, & Bao, 2015), with neuroticism consistently the strongest predictor of burnout among the Big five personality traits. However, to date relatively few longitudinal studies have been conducted examining the independent predictive values of personality for exhaustion and engagement (Alarcon et al., 2009).

1.2. Type D personality

A relatively recent addition to the personality factors that arethought to impact both burnout and work engagement is the so-called Type D (Distressed) personality type (Alarcon et al., 2009). It is defined as a combination of both high levels of negative affect and social inhibition. After its first inception in a number of cluster analytic studies for the relationship between the different personality traits included in the study (Denollet & De Potter, 1992), the type D personality construct went on to be used in research, initially mainly focused on psychosocial risk factors for cardiovascular disease.

To date, only a small number of cross-sectional studies assessed the role of type D personality in determining work-related outcomes. Findings suggest that Type D personality increases the risk for burnout and lower work engagement (e.g., Polman, Borkoles, & Nicholls, 2010; Van den Tooren & Rutte, 2016). However, cross-sectional study designs severely limit conclusions about the effects of type D-personality because of the inability to control for existing exhaustion or engagement levels. Furthermore, there has been criticism of the Type D construct regarding its added value when compared to existing and well-established constructs such as neuroticism (e.g. Coyne & de Voogd, 2012), as it shares similarities with this and other well-established personality factors.

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To fill the gap of scientific knowledge with regard to the longitudinal effects of type D personality and its added value compared to a well-established known predictor of employee well-being (neuroticism), the aim of the present longitudinal study was twofold: to test if type D personality is an independent risk factor for emotional exhaustion (the main element of burnout) and work engagement, over and above job demands, job resources, and existing emotional exhaustion and engagement; and to examine its added value compared to a wellestablished and closely related personality construct – neuroticism.

2.   Methods

2.1.   Participants and procedure

For the present study we extracted data from the Longitudinal Internet Studies for the Social Sciences (LISS) panel. This panel study is based on a traditional random sample of the Dutch population drawn from the general population register, and is operated by CentERdata (Tilburg, the Netherlands; Van den Tooren & Rutte, 2016). The panel consists of around 7500 individuals who fill out monthly surveys. Panel members who did not have a computer and/or Internet were provided with the necessary equipment and received an incentive of 15 euro per hour for their participation. The studies in the panel were all approved by an ethical committee. All participants signed an informed consent form. Further information about all conducted surveys and regulations for free access to the data, which can be used to replicate our findings, can be found at www.lissdata.nl (in English).

We extracted data on neuroticism measured in May 2011 (T0), on burnout symptoms (emotional exhaustion), work engagement, job resources and demands, and type D personality examined in January 2012 (T1), and burnout symptoms (emotional exhaustion) and work engagement assessed in July 2012 (T2). For each survey reminders were sent after the mentioned month. Response rates were 76.3%, 79.1% and 74.9% at T0, T1 and T2, respectively. The study of Van den Tooren and Rutte (2016), was based on the data of T1 (N=3382). We first selected respondents that participated at T1 and T2 (N=2983). Of this sub group we selected respondents who were employed during the total 7-month study period (had paid assignment, worked or assisted in family business, or was autonomous professional, freelancer, or selfemployed each month from January to July 2012), totaling 2273 respondents.

2.2.   Measures

2.2.1   Type D personality

Type D personality was measured at T2 using the Type D Scale-14 (DS-14; Denollet, 2005). This instrument consists of two subscales: one subscale measuring negative affectivity (e.g., "I take a gloomy view of things", α=0.87) and one assessing social inhibition (e.g., "I don't know what to talk to others about", α= =0.84). Responses on both 7- item subscales, are scored on a 5-point Likert scale ranging from 0 (false) to 4 (true). As in previous studies (Denollet, 2005; Van den Tooren & Rutte, 2016), scores from both subscales are used to determine whether respondents have a Type D personality. If scores on both subscales are greater or equal to 10, respondents were classified as having Type D personality, when scores are lower than 10, respondents were classified as non-Type D.

2.2.2.   Job demands

Two types of job demands were measured at T1: emotional job demands (e.g., "Does your work require you to persuade or convince other people?", α=0.79) and cognitive job demands (e.g., "Does your work require you continually pay attention to what you are doing?", α=0.89). Both were

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measured using 7 items derived from a questionnaire on characteristics of the work environment (Van Veldhoven & Meijman, 1994). Scores on a 4-point frequency scale range from 1 (always) to 4 (never). After reverse coding, items are summed, such that higher scores signify greater demands.

2.2.3. Job resources

Two types of job resources were measured at T1: emotional job resources (e.g., "When I am at work, I have the option of taking a mental break", α=0.93) and cognitive job resources (e.g., "When I am at work, I have the option of calling on the knowledge and expertise of colleagues", α=0.83). Both types of resources were measured using items from the DISQ2.1 questionnaire (De Jonge et al., 2009). Each scale consists of 5 items, with scores on a 4-point frequency scale ranging from 1 (never) to 4 (always), where high scores correspond to greater job resources.

2.2.4. Emotional exhaustion

Burnout symptoms (i.e. emotional exhaustion) were measured at T1 and T2 using 5 items from the Dutch version of the Maslach Burnout Inventory: the Utrecht Burnout Scale (e.g. "At the end of a working day I feel drained", α≥0.91; UBOS; Schaufeli & Van Dierendonck, 2000). Items were scored on a 7-point Likert scale, with answer options ranging from 0 (never) to 6 (always). After reverse coding, scores are summed with higher scores indicating higher levels of emotional exhaustion.

2.2.5. Engagement

Work engagement was measured at T1 and T2 using the 9-item Utrecht Work Engagement Scale (e.g. "I find my work inspiring", α≥0.94; UWES-9; Schaufeli, Bakker, & Salanova, 2006). Item scores range from 0 (never) to 6 (always) on a 7-point Likert scale. Scores are summed, with higher scores indicating higher levels of work engagement.

2.2.6. Neuroticism

Neuroticism was assessed with 10 items (e.g. "I worry about things", α=0.89) from the International Personality Item Pool (IPIP; Goldberg, 1992). Individual items are statements describing an individual's characteristics. Items are scored on a 5-point Likert scale with scores ranging from 1 (very inaccurate) to 5 (very accurate). After reverse coding, scores are summed with greater scores indicating higher neuroticism levels.

2.3. Analyses

All analyses were conducted using IBM SPPS (version 25). Intercorrelations were computed to explore if predictors were significantly associated with emotional exhaustion and engagement. Series of hierarchical multiple regressive analyses were conducted with emotional exhaustion and engagement at T2 as dependent variables. With respect to the longitudinal analyses, at step 0 existing exhaustion or engagement at T0 and gender and age were entered. At step 1 emotional and cognitive demands and resources at T1 were added, at step 2 Type D personality was added, and at step 3 neuroticism was added to the list of predictors. Because the number of respondents with data on neuroticism (n=1785) is lower than the total study sample (n=2273) the regression analyses were conducted using the missing pairwise subcommand of SPSS. The cross-sectional analyses were identical to the longitudinal analyses, except that in the cross-sectional analyses step 0 could not be performed and was omitted. Common-Method bias was examined using Harman's single factor test. Results showed it does not appear to have a substantial impact on the present study (only 20.2% of covariance is explained by a single factor).

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3.   Results

3.1.   Participants

Of the total study sample (N=2273), 50.1% was male and 49.9% female, with an average age of 45.1 years (SD=11.3). With respect to highest achieved education level, 15.9% had university level, 29.8% had higher vocational education level, 35.1% had higher secondary education/ senior high school level or intermediate vocational education/junior college level and 24.7% primary school or intermediate secondary education or had not started with an education (0.2%). Of the total study sample, 19.4% worked in healthcare and welfare, 9.5% in industrial, 9.3% in government services, public administration and mandatory social insurances, 8.8% in education sector, 7.2% in retail trade (including repairs of consumer goods), 6.2% in business services (including real estate, rental), 4.6% in financial sector, 4.1% in transport, storage and communication, 4.0% in construction, 2.3% in environmental services, culture, recreation and other services, 2.2% in catering, 2.1% in agriculture, forestry, fishery, hunting, 1.1% in utilities production, distribution and/or trade (electricity, natural gas, steam, water), 0.1% in mining, 13.8% in other sectors and for 5.3% the current sector was unknown. In total, 22.8% of the study sample met the criteria of having a Type D personality, which is in line with previous research (Denollet, 2005; Polman et al., 2010).

3.2.   Intercorrelations

The intercorrelations between study variables are shown in Table 1. On a bi-variate level, job demands, job resources and Type D personality at T1, as well as neuroticism at T0, are significantly associated with exhaustion and engagement at T2. As expected, neuroticism at T0 is modestly associated with Type D personality at T1 (r=0.42, p < .001). Additional analyses showed that neuroticism is strongly associated with the subscale negative affect (r=0.67, p < .001) compared to social inhibition (r=0.29, p < .001).

3.3.   Multiple regression analyses total sample

    The results of the hierarchical multiple regression analyses are presented in Tables 2 and 3. The longitudinal analyses showed that exhaustion at T2 (Table 2), was predominantly predicted by existing exhaustion at T1. At step 1, of the demands and resources only emotional demands was a significant predictor for exhaustion explaining a trivial proportion of variance of exhaustion (0.4%). Type D personality was a significant but trivial predictor at step 2 (ΔR2=0.01). Neuroticism significantly explained only 0.7% at step 3, over and above all other predictors. After inclusion of neuroticism, the effect of Type D personality was no longer significant, while that of neuroticism was significant. In contrast, in the cross-sectional analyses all demands and resources (except cognitive resources), Type D personality and neuroticism were significant predictors. However, in the cross-sectional analyses Type D personality added only 1.4% to explained variance over all other predictors.

    An almost similar pattern for the longitudinal compared to the cross-sectional analyses was found for engagement. Engagement was predominantly predicted by existing levels of engagement at T1. Cognitive demands and resources explained a significant but trivial proportion of variance of engagement at T2 at step 1 (0.3%). Although statistically significant, Type D personality explained only 0.2% of variance of engagement at step 2 and remained significant at step 3. The explained variance of the predictors was (much) higher in the cross-sectional analyses than in the longitudinal analyses controlling for existing engagement at T1. In the cross-sectional analyses and longitudinalanalyses, Type D personality added only 0.2% and 0.1% respectively to the explained variance of engagement, over and above all other predictors. The effects of Type D personality and neuroticismwere roughly similar in both cross-sectional and longitudinal models, with the difference that in the longitudinal model, the effect of type D personality failed to reach significance.

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We repeated the longitudinal analyses using the two subscales of the Type D personality measure (negative affectivity and social inhibition, r=0.44, p < .001) instead of Type D personality as a dichotomous variable. Findings of the full longitudinal models (step 3) were similar. When step 2 was divided in step 2a (entering one subscale of type D personality) and step 2b (entering the other subscale of Type D personality), results showed that only the subscale negative affect was a significant independent but trivial predictor explaining<0.2% of the dependent variables. We repeated all regression analyses using a listwise deletion of cases showing similar results. The variance inflation factors (VIF's) of all conducted multiple regression analyses were above 1 and below 2.31.

3.4.   Multiple regression analyses among two sub samples

Given the results described above, we repeated the longitudinal regression analyses of Tables 2 and 3 among two exclusive subsamples: respondents who worked in healthcare-welfare (n=323) and respondents who worked in education (n=146) during the study period. Findings were, taking into account that the subsamples were relatively small compared to the total sample, more of less similar (see Appendix 1 and 2).

4.   Discussion

To the best of our knowledge, this is the first large population-based prospective study assessing the predictive values of Type D personality and job demands and resources on emotional exhaustion and engagement, while taking existing emotional exhaustion and engagement, and neuroticism into account.

Our study confirms the results of previous studies that Type D personality and aspects of job demands and resources are cross-sectionally associated with exhaustion and engagement. However, a major finding of the longitudinal analyses in this study is that Type D personality is not an independent predictor when existing exhaustion, engagement, job demands and resources, and neuroticism are taken into account. Before controlling for existing neuroticism, Type D personality explained a trivial proportion of the variance of emotional exhaustion and engagement (< 0.03%).

[Table 1]

[Table 2]

Additional cross-sectional analyses showed that Type D personality explained a very small proportion of the variance of exhaustion (1.3%) and engagement (0.2%) at follow up, when also neuroticism was also taken into account. The fact that correlational analyses revealed that neuroticism at T0 strongly predicted negative affect symptoms of type D Personality and modestly predicted Type D personality 7 months later (T1) may explain the decrease in explained variance when controlling for neuroticism. Longitudinal analyses with negative affectivity and social inhibition instead of type D personality as predictors did not change findings. Taken together, these results do not provide evidence that type D personality plays a relevant role in the development of exhaustion and engagement in a six-month period.

The full longitudinal models also showed very weak effects of job demands and resources on exhaustion and engagement, compared to the cross-sectional analyses, indicating that cross-sectional studies are very sensitive for over-estimating effects of demands and resources (besides the obvious causality problem). Thus, we found little support for both the health-impairment process and the motivational process of the JDR-model (Lesener et al., 2019), namely that high levels of job demands will lead to negative health outcomes, and that high levels of job resources will protect against the negative effects of job demands: the explained variance over and above existing

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exhaustion and engagement was<1%. For this reason, it is difficult to give meaning to the unexpected finding that the beta of cognitive demands was positive in the full model predicting engagement. A possible explanation for this effect is that individuals prefer work that offers some challenge.

However, we should be aware that the results of multiple regression analyses in studies on this topic are always presented in terms of (unique) explained variance of variables, while the results of structural modelling on this topic are most often presented only in terms of model fit (RMSEA, CFI, AIC) such as in the longitudinal study of Hakanen, Schaufeli, and Ahola (2008).

[Table 3]

Conversely, neuroticism remained a significant independent predictor in the full longitudinal models although the predictive values were weak, explaining<1% over other study variables. Previous studies have suggested that neuroticism is a risk factor for emotional exhaustion and one of its stronger predictors compared to other personality traits (Alarcon et al., 2009; Maslach & Leiter, 2008). Additionally, work engagement is characterized by low neuroticism in combination with high extraversion and high levels of mobility (Langelaan, Bakker, Van Doornen, & Schaufeli, 2006).

In the longitudinal models, the strongest and dominant predictors of emotional exhaustion and engagement at T2, were by far T1 levels of emotional exhaustion and engagement, respectively. This strong autoregressive effect is not unexpected, and in line with previous numerous previous studies showing that the best predictors of psychological symptoms are earlier levels of the same symptoms, such as posttraumatic stress (e.g. Lesener et al., 2019), anxiety and depression (e.g. Sowislo & Orth, 2013). However, the effect sizes in our study, besides existing exhaustion and engagement, were trivial and presumably significant because of the large sample size. The longitudinal analyses among respondents working in the healthcare-welfare sector and education sector did not reveal substantially different patterns. [Figuur 1]

4.1.   Strengths and limitations

A major strength of our study is the focus on a large and heterogeneous longitudinal sample which was randomly selected from the Dutch population. We used the well-known JD-R theoretical framework of Bakker and Demerouti (2007) and prospectively assessed the influence of neuroticism.

However, the findings are also subjected to some limitations. Firstly, this study relied merely on self-reported measures for data gathering, which might contribute to common method bias (Podsakoff, MacKenzie, & Podsakoff, 2012). Future research would benefit from integrating different information sources. We also assessed associations among two sectors with similar results, but cannot rule out other outcomes among other sectors. Although we used a 3-wave longitudinal design, this design involved only two waves aimed at exhaustion and engagement. In principle it is possible that stronger independent effects of demands, resources and Type D personality can be found using a smaller (e.g. 3 instead of 6 months) or a larger time interval (Hakanen et al., 2008).

Either way, findings stress the necessity of rigorous study designs taking into account corresponding variables assessed at earlier time points, to prevent over-estimations of effects that may lead to incorrect conclusions (Maxwell, Cole, & Mitchell, 2011). Practical implications of these findings are that policy makers and human resource managers should not put too much emphasis on screening for Type D personality or aiming interventions at individuals who fulfil this specific personality profile, as these are only weak predictors of emotional exhaustion and work engagement

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Appendix 1

	Predicting exhaustion at T2*									
	Healthcare and welfare (n = 323)					Education (n = 146)				
	R2	B	Se	β	p	R2	B	se	β	p
Step 0										
Engagement T1	0.544***	0.756	0.039	0.737	0.000-	0.733***	0.867	0.046	0.856	0.000
Step 1										
Engagement T1	0.008	0.718	0.043	0.699	0.000	0.002	0.861	0.050	0.850	0.000
Cognitive demands T1		−0.004	0.070	−0.002	0.957		0.093	0.120	0.041	0.443
Emotional demands T1		0.194	0.096	0.089	0.044		−0.047	0.136	−0.018	0.730
Cognitive resources T1		0.065	0.066	0.049	0.329		−0.074	0.098	−0.043	0.450
Emotional resources T1		−0.092	0.064	−0.071	0.148		−0.004	0.080	−0.003	0.960
Step 2										
Engagement T1	0.004	0.703	0.044	0.685	0.000	0.001	0.869	0.051	0.857	0.000
Cognitive demands T1		0.004	0.070	0.003	0.951		0.086	0.121	0.038	0.477
Emotional demands T1		0.208	0.096	0.095	0.032		−0.044	0.137	−0.017	0.747
Cognitive resources T1		0.060	0.066	0.045	0.369		−0.071	0.098	−0.042	0.469
Emotional resources T1		−0.091	0.064	−0.070	0.151		−0.008	0.080	−0.006	0.921
Type D personality T1		0.163	0.103	0.062	0.117		−0.081	0.137	−0.029	0.553
Step 3										
Engagement T1	0.012**	0.660	0.046	0.644	0.000	0.006	0.851	0.052	0.840	0.000
Cognitive demands T1		0.047	0.071	0.028	0.505		0.118	0.122	0.052	0.334
Emotional demands T1		0.196	0.095	0.090	0.041		−0.037	0.136	−0.014	0.787
Cognitive resources T1		0.064	0.066	0.049	0.326		−0.087	0.098	−0.051	0.373
Emotional resources T1		−0.085	0.063	−0.065	0.177		0.016	0.081	0.011	0.842
Type D personality T1		0.073	0.107	0.028	0.494		−0.161	0.144	−0.057	0.265
Neuroticism T0		0.020	0.007	0.129	0.004		0.015	0.009	0.087	0.103

Data of predictors age and gender (B, se, β and p-value) are not shown in table to prevent lengthy tables. Healthcare and welfare = respondents were working in this sector in 2011 and in 2012 and in 2013, according to yearly assessments in April 2011, April 2012 and April 2013. Education = respondents were working in this sector according to yearly assessments in April 2011, April 2012 and April 2013.

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

Appendix 2

	Predicting engagement at T2*									
	Healthcare and welfare (n = 323)					Education (n = 146)				
	R2	B	se	β	p	R2	B	se	β	p
Step 0										
Engagement T1	0.590**	0.839	0.040	0.769	0.000	0.626***	0.780	0.053	0.793	0.000
Step 1										
Engagement T1	0.007	0.818	0.043	0.750	0.000	0.015	0.803	0.057	0.816	0.000
Cognitive demands T1		0.128	0.072	0.071	0.076		0.132	0.129	0.064	0.307
Emotional demands T1		−0.005	0.091	−0.002	0.954		−0.236	0.142	−0.101	0.097
Cognitive resources T1		−0.100	0.067	−0.071	0.138		0.005	0.105	0.003	0.960
Emotional resources T1		0.090	0.067	0.064	0.182		−0.121	0.088	−0.092	0.173
Step 2										
Engagement T1	0.012**	0.796	0.043	0.729	0.000	0.002	0.797	0.057	0.810	0.000
Cognitive demands T1		0.120	0.071	0.066	0.093		0.128	0.129	0.062	0.323
Emotional demands T1		−0.014	0.090	−0.006	0.880		−0.225	0.142	−0.096	0.116
Cognitive resources T1		−0.092	0.067	−0.065	0.168		0.010	0.105	0.006	0.926
Emotional resources T1		0.093	0.066	0.067	0.160		−0.126	0.089	−0.096	0.158
Type D personality T1		−0.314	0.103	−0.111	0.002		−0.115	0.143	−0.044	0.420
Step 3										
Engagement T1	0.013**	0.773	0.043	0.708	0.000	0.001	0.800	0.058	0.814	0.000
Cognitive demands T1		0.083	0.071	0.046	0.245		0.135	0.130	0.065	0.303
Emotional demands T1		0.033	0.089	0.014	0.712		−0.226	0.143	−0.097	0.116
Cognitive resources T1		−0.100	0.066	−0.070	0.128		0.005	0.106	0.003	0.964
Emotional resources T1		0.089	0.065	0.064	0.174		−0.119	0.090	−0.091	0.187
Type D personality T1		−0.203	0.107	−0.072	0.058		−0.141	0.154	−0.054	0.360
Neuroticism T0		−0.021	0.007	−0.131	0.001		0.004	0.010	0.028	0.651

Data of predictors age and gender (B, se, β and p-value) are not shown in table to prevent lengthy tables. Healthcare and welfare = respondents were working in this sector in 2011 and in 2012 and in 2013, according to yearly assessments in April 2011, April 2012 and April 2013. Education = respondents were working in this sector according to yearly assessments in April 2011, April 2012 and April 2013.

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

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Tables and figures

Table 1: Intercorrelations, mean and standard deviations study variables.

		1	2	3	4	5	6	7	8	9	M	SD
1	Engagement T1	1									4.67	1.11
2	Emotional exhaustion T1	−0.370***									2.57	1.00
3	Cognitive demands T1	0.250***	0.143***								3.08	0.59
4	Emotional demands T1	0.081***	0.297***	0.345***							1.91	0.47
5	Cognitive resources T1	0.161***	−0.042*	0.214***	0.064**						2.88	0.79
6	Emotional resources T1	0.259***	−0.114***	0.117***	0.074***	0.533***					2.45	0.80
7	Type D Personality T1[1]	−0.278***	0.266***	−0.063**	0.015	−0.065**	−0.120***				0.23	0.42
8	Neuroticism T0	−0.284***	0.376***	−0.096***	0.073**	−0.152***	−0.126***	0.418***			15.83	6.67
9	Engagement T2	0.773***	−0.333***	0.234***	0.074**	0.095***	0.184***	−0.258***	−0.276***		4.63	1.14
10	Emotional exhaustion T2	−0.332***	0.731***	0.122***	0.265***	−0.048*	−0.105***	0.228***	0.351***	−0.370***	2.59	1.04

[1]Type D personality: 0 = no, 1 = yes.

Note. Intercorrelations for all T1 and T2 variables are based on 2273 respondents. Intercorrelations with neuroticism (T0) are based on 1785 respondents.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2: Results hierarchical multiple regression analyses predicting emotional exhaustion.

	Exhaustion at T1					Exhaustion at T2				
	R2	B	se	B	p	R2	B	se	β	p
Step 0										
Emotional exhaustion T1		–	–	–	–	0.535***	0.75	0.02	0.73	0.000
Step 1										
Emotional exhaustion T1	0.117***	–	–	–	–	0.004**	0.73	0.02	0.71	0.000
Cognitive demands T1		0.11	0.04	0.07	0.007		0.01	0.03	0.01	0.653
Emotional demands T1		0.61	0.05	0.29	0.000		0.12	0.04	0.06	0.002
Cognitive resources T1		−0.01	0.03	−0.00	0.872		−0.02	0.03	−0.02	0.371
Emotional resources T1		−0.19	0.03	−0.15	0.000		−0.02	0.03	−0.02	0.355
Step 2										
Emotional exhaustion T1	0.061***	–	–	–	–	0.001*	0.72	0.02	0.70	0.000
Cognitive demands T1		0.14	0.04	0.08	0.001		0.02	0.03	0.01	0.534
Emotional demands T1		0.59	0.05	0.28	0.000		0.13	0.04	0.06	0.002
Cognitive resources T1		−0.01	0.03	−0.00	0.867		−0.03	0.03	−0.02	0.370
Emotional resources T1		−0.15	0.03	−0.12	0.000		−0.02	0.03	−0.02	0.437
Type D personality T1		0.60	0.05	0.25	0.000		0.09	0.04	0.04	0.029
Step 3										
Emotional exhaustion T1	0.073***	–	–	–	–	0.007***	0.69	0.02	0.67	0.000
Cognitive demands T1		0.18	0.04	0.10	0.000		0.04	0.03	0.02	0.247
Emotional demands T1		0.52	0.05	0.24	0.000		0.12	0.04	0.05	0.002
Cognitive resources T1		0.03	0.03	0.02	0.337		−0.01	0.03	−0.01	0.660
Emotional resources T1		−0.13	0.03	−0.10	0.000		−0.02	0.03	−0.01	0.550
Type D personality T1		0.30	0.06	0.12	0.000		0.01	0.04	0.00	0.827
Neuroticism T0		0.05	0.00	0.31	0.000		0.02	0.00	0.10	0.000

Data of predictors age and gender (*B*, *se*, *β* and *p*-value) are not shown in table to prevent lengthy tables.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3: Results hierarchical multiple regression analyses predicting engagement.

	Engagement at T1					Engagement at T2				
	R2	B	se	β	p	R2	B	se	β	P
Step 0										
Engagement T1		–	–	–	–	0.598***	0.80	0.02	0.77	0.000
Step 1										
Engagement T1	0.118***	–	–	–	–	0.003*	0.79	0.02	0.77	0.000
Cognitive demands T1		0.43	0.05	0.23	0.000		0.10	0.03	0.05	0.002
Emotional demands T1		−0.04	0.06	−0.02	0.477		−0.01	0.04	−0.00	0.858
Cognitive resources T1		−0.01	0.04	−0.01	0.755		−0.06	0.03	−0.04	0.017
Emotional resources T1		0.34	0.04	0.24	0.000		0.01	0.03	0.01	0.788
Step 2										
Engagement T1	0.055***	–	–	–	–	0.002***	0.78	0.02	0.75	0.000
Cognitive demands T1		0.40	0.04	0.21	0.000		0.10	0.03	0.05	0.002
Emotional demands T1		−0.01	0.05	−0.01	0.810		−0.00	0.04	−0.00	0.964
Cognitive resources T1		−0.01	0.04	−0.01	0.747		−0.06	0.03	−0.04	0.017
Emotional resources T1		0.30	0.04	0.22	0.000		0.00	0.03	0.00	0.902
Type D personality T1		−0.62	0.06	−0.24	0.000		−0.13	0.04	−0.05	0.002
Step 3										
Engagement T1	0.024***	–	–	–	–	0.002**	0.77	0.02	0.75	0.000
Cognitive demands T1		0.38	0.04	0.20	0.000		0.10	0.03	0.05	0.003
Emotional demands T1		0.03	0.05	0.01	0.590		0.01	0.04	0.01	0.775
Cognitive resources T1		−0.04	0.04	−0.03	0.340		−0.07	0.03	−0.05	0.008
Emotional resources T1		0.28	0.04	0.20	0.000		0.00	0.03	0.00	0.984
Type D personality T1		−0.43	0.06	−0.17	0.000		−0.08	0.05	−0.03	0.078
Neuroticism T0		−0.03	0.00	−0.18	0.000		−0.09	0.00	−0.05	0.002

Data of predictors age and gender (*B*, *se*, *β* and *p*-value) are not shown in table to prevent lengthy tables.

* p < .05.
** p < .01.
*** p < .001.