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Disentangling stability and change in job resources, job demands, and employee well-being — A three-wave study on the Job-Demands Resources model

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ABSTRACT

This study aims to: (1) examine the stable and changing components across time of job resources, job demands, work engagement, and burnout, and (2) investigate the relationships – as specified by the Job Demands-Resources model – between job characteristics (demands and resources) and employee well-being (burnout and engagement) when controlled for their stable components. These two issues were addressed using longitudinal data from 3 waves with a 1-year time interval ($N = 1038$). Results from structural equation modeling indicate that the stable component accounts for 48–69% (waves 1 to 3) of the total variance in job resources, whereas for job demands these percentages range from 30 to 35% (waves 1 to 3). Moreover, it appears that 54–66% (waves 1 to 3) of the variance in work engagement and 40–45% (waves 1 to 3) of the variance in burnout are accounted for by a stable component. Hence, compared to the negative aspects of the working environment (i.e., job demands and burnout), positive aspects (i.e., job resources and work engagement) seem to be more stable. We also detected significant relationships between the changing components of job resources and job demands on the one hand and work engagement and burnout on the other. These findings are consistent with the Job Demands-Resources model.

In the field of occupational health psychology, a core assumption is that job characteristics affect employee well-being (Bakker & Demerouti, 2007; Levi, 2010). A rapidly growing body of research focusing on the combination of job resources and job demands and analyzing their influence on work-related well-being, is building theoretically and empirically on the Job Demands-Resources model (JD-R model; Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004; Schaufeli & Taris, in press). The JD-R model is usually investigated using cross-sectional as well as common longitudinal research methods and strategies of analysis.

This study follows a new approach by applying a longitudinal stability and change model that is based on the idea of a dynamic equilibrium (see below; Heady & Wearing, 1989; Ormel & Schaufeli, 1991). To date, only few studies attempted to incorporate a dynamic equilibrium perspective into occupational health research which allows to address the questions to what extent each core component of the JD-R model (i.e., job demands, job resources, burnout and engagement) can be attributed to stable and changing factors and moreover, whether the theoretically and empirically demonstrated relationships, as assumed by the JD-R model, remain significant after controlling for stable factors. This way a more accurate investigation is possible of the longitudinal relationship between job characteristics and employee well-being.

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1. The JD-R model

The JD-R model has gained much popularity and can be used as the basis for the improvement of employee well-being and performance in different types of occupations and organizations (Schaufeli & Taris, in press). It was introduced as an alternative to other models of employee health and well-being, such as Karasek's (1979) job demand-control model and Siegrist's (1996, 2002) effort-reward imbalance model. The JD-R model was initially applied to burnout (Demerouti et al., 2001), which can be defined as "a prolonged response to chronic emotional and interpersonal stressors on the job" (Maslach, Schaufeli, & Leiter, 2001; p. 397). Three years after its introduction, Schaufeli and Bakker (2004) presented an extended version of the JD-R model that in addition to burnout included work engagement as its positive counterpart.

Schaufeli, Salanova, González-Romá, and Bakker (2002) defined work engagement as:

> "a positive, full-filling, work-related state of mind that is characterized by vigour, dedication, and absorption. Vigour is characterized by high levels of energy and mental resilience while working… Dedication is characterized by a sense of significance, enthusiasm, … and challenge. …absorption is characterized by being fully concentrated and deeply engrossed in one's work" (pp. 74–75).

The first main assumption of the JD-R model is that in any job, two kinds of characteristics can be distinguished that are related to burnout and work engagement: job demands and job resources. Job demands refer to "physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills and are therefore associated with certain physiological and/or psychological costs" (Bakker & Demerouti, 2007, p. 312). Job resources refer to physical, psychological, social, or organizational aspects of the job that may be functional in meeting job requirements and may thus reduce the associated physiological and/or psychological costs and/or stimulate personal growth and development. Job resources can be located in the work context (at the level of the organization, such as pay, career opportunities, job security), in interpersonal and social relations (e.g., supervisor support), or in the tasks themselves (e.g., performance feedback, skill variety, and autonomy) (see Bakker & Demerouti, 2007; Bakker, Demerouti, & Schaufeli, 2003; Demerouti et al., 2001; Schaufeli & Taris, in press). In the current study, the following job demands and resources were investigated: work interruption, time pressure, uncertainty at work, qualitative overload, social support at work, task identity, appreciation at work, and interpersonal justice.

The second main assumption of the JD-R model proposes that employee well-being results from two relatively independent processes (Bakker & Demerouti, 2007): (1) the health impairment process, in which poorly designed jobs and chronic job demands exhaust employees' mental and physical resources; this might lead to the depletion of mental energy (burnout) and eventually to health problems, and (2) the motivational process in which job resources exert their motivating potential and lead to a positive affective-motivational state (work engagement); this might foster positive organizational outcomes like good performance, low sickness absence, and organizational commitment. More specifically, the JD-R model assumes that job resources are related to both burnout and engagement, whereas job demands are strongly related to burnout but not or only weakly related to engagement (Hu, Schaufeli, & Taris, 2011; Schaufeli & Taris, in press).

In the literature on the JD-R model, numerous cross-sectional studies found evidence for the core assumptions of the model within various samples and different countries (e.g., Hakanen, Bakker, & Schaufeli, 2006; Lewig, Xanthopoulou, Bakker, Dollard, & Metzer, 2007; Llorens, Schaufeli, Bakker, & Salanova, 2007). Moreover, there are also several longitudinal studies on the JD-R model (e.g., de Lange, De Witte, & Notelaers, 2008; Schaufeli, Bakker, & Van Rhenen, 2009) even with three waves (Hakanen, Bakker, & Jokisaari, 2011; Hakanen, Schaufeli, & Ahola, 2008). To additionally contribute to this extensive research, in the current study we follow an innovative approach by implementing a longitudinal stability and change model based on the idea of a dynamic equilibrium (see Heady & Wearing, 1989; Ormel & Schaufeli, 1991). This model allows us to investigate relationships between job characteristics and employee well-being, thereby simultaneously controlling for stability across time (i.e., for previous occasions) but also for the stable (time-independent) components within the different elements of the JD-R model.

2. Dynamic equilibrium model (extended)

According to the dynamic equilibrium model as proposed by Heady and Wearing (1989), each person has a "normal" pattern of life events and a "regular" psychological symptom level, both of which are supposed to be predictable on the basis of stable person characteristics and/or stable environmental conditions. Moreover, the model implies that decisive external forces (such as a supervisor's critique, waves of redundancies, or mobbing experiences) cause changes in these normal characteristic levels. However, these disruptions are expected to be only temporary, since internal adaptive processes (such as various coping mechanisms) will cause the person to return to his or her characteristic level. The stronger these individual, adaptive processes that maintain the equilibrium, the less the impact external forces have, i.e., the larger the stable component is (Gorgievski-Duijvesteijn, Bakker, Schaufeli, & van der Heijden, 2005; Ormel & Schaufeli, 1991). Based on the logic of this dynamic equilibrium, Ormel and Schaufeli (1991) developed a stability and change model — also dubbed the trait-state-occasion model (Cole, Martin, & Steiger, 2005).

A methodological prerequisite of such a stability and change model is a sample of subjects at series of at least three different points in time, i.e. a longitudinal dataset that includes at least three measurement waves. Ormel and Schaufeli (1991) express the stability and change model by the following general equation (excluding the measurement error for the sake of simplicity):

$$S_{ij} = SS_i + C_{ij}$$

whereby S_{ij} represents the actual value of the assessed variable (S_i) as it is reported by each participant at time j. SS_i represents the non-observed stable and C_{ij} the non-observed changing amount of the respective variable. In the absence of external changes, C_{ij} equals zero since the stability and change model assumes that a person's characteristic level remains perfectly stable in that case (Ormel & Schaufeli, 1991).

As this equation implies, the measured values of a variable are functions of two non-measured latent variables (SS_i and C_{ij}). The stability variable (SS_i) reflects the effects of stable attributes of the person and his or her social environment. Such attributes can include personality traits or pervasive social and economic environmental conditions. In line with the dynamic equilibrium model, Ormel and Schaufeli (1991) assume that adaptive mechanisms are activated when external changes occur which will act to sustain the characteristic level. The effectiveness of the adaptive mechanisms depends on the psychobiological predispositions of the person and on stable environmental factors. The latent change variable (C_{ij}) on the other hand reflects the effects of various social, psychological, and biological external change events (Ormel & Schaufeli, 1991).

Two assumptions are needed for the calculation of a stability and change model based on the above shown equation: (1) A person's characteristic level of a variable is statistically independent of its change. This implies that the non-observed SS_i and C_{ij} are uncorrelated. (2) A person's deviation from the stable, characteristic level at a certain point of time (C_{ij}) depends on the deviation at a previous point in time and on the extent of non-normal exposure to change events during the respective interval (Ormel & Schaufeli, 1991, based on Duncan-Jones (1985)).

In accordance with the stability and change model we assert that the core factors of the JD-R model (i.e., job demands, job resources, job burnout, and work engagement) have a stable (i.e., trait-like, time-invariant) component as well as a changing (i.e., state-like) component that fluctuates across time. This means that the stability and change model allows us to disentangle the stable and changing components of each element that constitutes the JD-R model. In other words, the relationships between job characteristics (i.e., demands and resources) and employee well-being (i.e., burnout and engagement) can be studied when controlling for the time-invariant stability of all measures involved. By applying the notion of stability and change to the JD-R model, a more differentiated estimation can be made of the strengths of relationships between demands/resources and burnout/engagement – i.e., the relationships adjusted for the influence of the time-invariant stability – whereby the stable, trait-like components of the measures are taken into account. In consequence, this implies that in all longitudinal studies with the JD-R model so far "true" change has not been studied, because it always has been contaminated with stability.

To date, only a few studies used the dynamic equilibrium perspective and estimated the proportions of stable vs. changing variance of (employee) well-being and other (workplace) variables. In two longitudinal studies (the first with three waves and two 1-year time intervals and one 7-year time interval and the second with five waves and 6-month time intervals), Ormel and Schaufeli (1991) found that about two-thirds of the variance in psychological distress among unemployed and in a general population sample could be attributed to a latent stability factor that was associated with self-esteem and external locus of control. Another study on psychological distress among farmers with a three-wave longitudinal design with 1-year time intervals found that its stable component accounted for 48–56% of the total variance (Gorgievski-Duijvesteijn et al., 2005). In this study it was also found that between 62 and 71% of the variance of self-reported illness was accounted for by a stable factor. In a 4-wave study (with three 1-year intervals and one 2-year interval), Dormann, Fay, Zapf, and Frese (2006) showed that about 25% of the variance of job satisfaction was explained by a stable factor. Finally, Schaufeli, Maassen, Bakker, and Sixma (2011) conducted a three-wave study (with 5-year time intervals) on stability and change in burnout among General Practitioners and found that across a period of ten years about one quarter was accounted for by a stable component.

In sum, with these inconsistent results, i.e. between 25 and 75% of the variance of well-being seems to be stable, it becomes evident that the amount of the stability varies depending on the type of investigated variable (general versus context-specific), the type of environment (stable versus constantly changing), on the profession, and the time interval that is investigated.

3. The present study

This study has two objectives: (1) to investigate to what extent observed levels of job demands, job resources, and employee well-being (i.e., burnout and work engagement) are determined by a time-invariant stable component, using three waves with a 1-year time interval, and (2) to estimate the strength of the relationships – as specified by the JD-R model – between job demands and job resources on the one hand, and burnout and work engagement on the other hand, not only controlling for previous measurement occasions (as in regular longitudinal studies) but also for the stable component as proposed by the stability and change model (Ormel & Schaufeli, 1991). Both are met by testing two structural equation models – for burnout and engagement separately – that disentangle the variance of the observed variables into a stable and a changing component (see Fig. 1). We expect that the relationships between job characteristics and well-being as predicted by the JD-R model are confirmed also after controlling for the impact of the stable components of all variables involved. More specifically, we expect that job demands are positively related to burnout and slightly negatively related to work engagement, whereas job resources are positively related to work engagement and negatively related to burnout (Schaufeli & Taris, in press). Finally, we expect positive cross-lagged effects from job resources on work engagement and from job demands on burnout, whereas we expect negative cross-lagged effects from job demands on work-engagement and from job resources on burnout.

In the research model in Fig. 1, job demands, job resources, and well-being are regarded as latent constructs measured at three time points (t1–t3), with a 1-year time interval. The employees' actual levels of job demands, job resources, and well-being are assumed to be the sum of two independent components: (1) a component reflecting the time-invariant stability, and (2) a component reflecting occasional changes. Therefore, the variances of the observed scores are partitioned into a stable component that is determined by stable

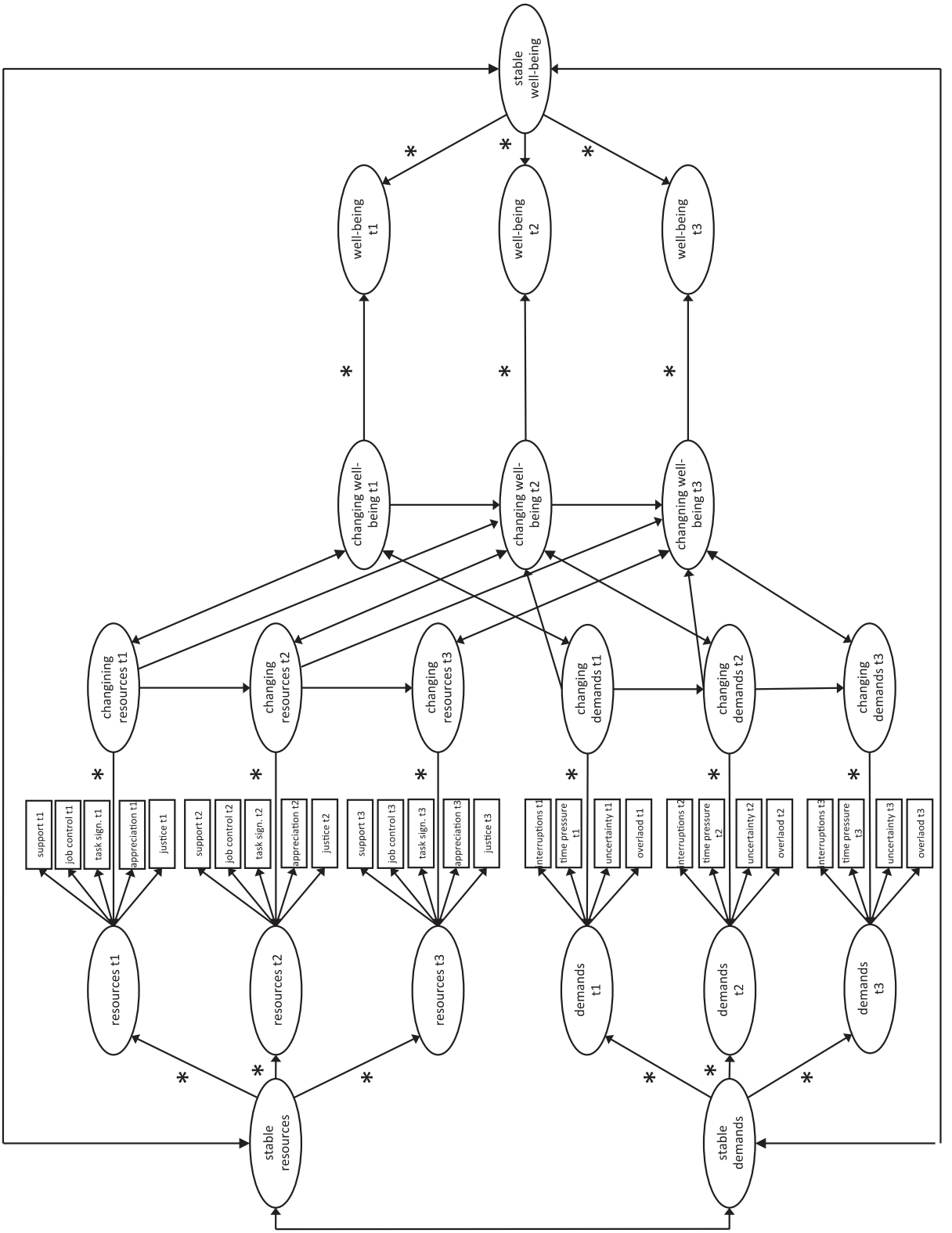

Fig. 1. The stability and change research model (* = constrained to 1.0).

personal and/or environmental characteristics and that – by definition – does not change across time, and a change component that is characterized by changes within the working environment and that – by definition – does change across time (Cole et al., 2005; Schaufeli et al., 2011).

In our research model the different parts of the JD-R model are linked assuming that: (1) the stable components are correlated with each other, and (2) the change components are correlated with each other. Moreover, the assumption of job resources, job demands, and well-being as the summation of a stable and a change component allows the fixation of 18 corresponding parameters at 1 (indicated by the asterisks in Fig. 1). Errors between the manifest variables of job demands and job resources are allowed to correlate. Since the time intervals between t1 and t2 and between t2 and t3 are equal, for reasons of parsimony all identical relationships were constrained to be equal across measurement moments. For the sake of clarity, these double-sided arrows representing the covariances between the manifest variables of the model are omitted in all figures.

4. Methods

4.1. Sample and procedure

The present three-wave study used data collected between 2008 and 2011 from medium sized and large Swiss organizations in diverse sectors. All members of the organizations were invited to participate, and they were allowed to complete the questionnaire during working time.

The sample comprised 3045 employees at baseline measurement (t1) who worked in six organizations that included three industrial production companies (28.9%; 10.7%; 20.5%), one food processing company (17.4%), one public administration service (17.6%), and one hospital (4.8%). At the first follow-up (t2) after one year, 3227 employees, and at second follow-up after two years (t3), 3074 employees participated in the study. Response rates were 76.5%, 65.5%, and 62.3% for t1, t2, and t3, respectively. The final panel of employees (N = 1033) who took part in the survey at all three occasions consisted of 715 male (68.9%) and 323 female employees (31.1%), with an average age at t1 of 39.4 years (SD = 10.55). In addition, 45.7% had a higher education degree (college or university). Organizational tenure was 9.4 years (SD = 9.24), with an average of 5.1 years (SD = 5.82) in the present job.

Participants completed an online questionnaire, called the S-Tool (Gesundheitsförderung Schweiz, 2011), that included questions on work characteristics and well-being. Participants were assured of the anonymity and confidentiality of the data in the introduction to the questionnaire. Due to the longitudinal study design, it was necessary to create an anonymous code. Thus participants had to create their code by indicating the number of siblings, the year their father was born, and the year their mother was born. Participation in the survey was on a voluntary basis.

4.2. Measures

4.2.1. Job resources

Four job resources were assessed. *Social support at work* was measured by three items drawn from a scale developed by Frese (1989). Participants had to assess how much they can rely on different people in difficult situations at work, namely, on their *direct supervisor*, their *closest colleagues*, and *other colleagues*. The items were scored on a 5-point scale ranging from 1 = *not true at all* to 5 = *a lot*. *Job control* was assessed using a scale with six items ranging from 1 = *very little/not at all* to 5 = *very much* from the instrument for stress-related job analysis (ISTA = Instrument zur Streßbezogenen TätigkeitsAnalyse; Semmer, Zapf, & Dunckel, 1999). An example item is, "Can you organize your workday autonomously?" *Task significance* was assessed by a single item (Udris & Rimann, 1999): "In my job one can produce something or carry out an assignment from A to Z" rated on a 5-point scale from 1 = *almost never/not at all true* to 5 = *almost always/fully true*. This item is derived from the validated, internationally used, salutogenetic subjective work analysis (SALSA = SALutogenetische Subjektive Arbeitsanalyse) questionnaire (Richter, Nebel, & Wolf, 2006; Rimann & Udris, 1997). *Appreciation* was assessed by two items (Jacobshagen, Oehler, Stettler, Liechti, & Semmer, 2008): "Overall, how satisfied are you with your line manager's appreciation of you as a person?" and "Overall, how satisfied are you with your colleagues' appreciation of you as a person?" These items were rated on a 7-point graphical scale using *smileys*. The scale was employed successfully in several Swiss studies (for example, Jacobshagen & Semmer, 2009; Stocker, Jacobshagen, Semmer, & Annen, 2010). *Interpersonal justice* describes the manner of interpersonal treatment by supervisors during decision-making processes (Colquitt, 2001). This scale comprises four items with a 5-point response scale from 1 = *to a small extent* to 5 = *to a large extent*. An example item is, "Has he/she treated you with respect?"

4.2.2. Job demands

Four job demands were assessed. *Work interruption* and *time pressure* were assessed with four items each ranging from 1 = *very rarely/never* to 5 = *very often/constantly* (Semmer et al., 1999). An example item for work interruption is, "How often are you interrupted at work by your colleagues?" and for time pressure, "At work, how often is a rapid pace required?" *Uncertainty at work* is characterized by unclear or ambiguous instructions and by the absence of sufficient information to make decisions (Semmer et al., 1999). This scale uses four items; three on a 5-point scale ranging from 1 = *very rarely/never* to 5 = *very often/constantly* and one item on a 5-point scale from 1 = *from nobody* to 5 = *from more than three persons*. An example item is, "From how many people do you regularly receive instructions?". *Qualitative overload* is assumed to occur when an employee has to fulfil tasks that are too complicated and too difficult (Udris & Rimann, 1999). The three items were assessed using a 5-point scale from 1 = *almost never/not at all true* to 5 = *almost always/fully true*. A sample item is, "It happens that the work is too difficult for me."

4.2.3. Employee well-being

Two types of employee well-being were assessed. *Work engagement* was tapped using the nine-item version of the Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006), which includes three subscales of three items each: *vigor* (e.g., "At work, I feel I am bursting with energy"), *dedication* (e.g., "My job inspires me"), and *absorption* (e.g., "Time flies when I'm working"). Participants responded using a 7-point scale (0 = *never*, 6 = *always*). *Burnout* was assessed using the Oldenburg Burnout Inventory (OLBI) (Demerouti, 1999). The convergent validity of the OLBI was shown with the Maslach Burnout Inventory (Demerouti, Bakker, Vardakou, & Kantas, 2004), which is the most widely used questionnaire to assess burnout (Maslach, Jackson, & Leiter, 1996). The OLBI includes two dimensions with eight items each: *exhaustion* and *disengagement*. An example item for exhaustion is, "After work, I usually feel worn out and weary" and for disengagement, "I usually talk about my work in a derogatory way." There were four response categories from 1 = *totally disagree* to 4 = *totally agree*.

4.3. Data analyses

We tested the research model with structural equation modeling methods (maximum likelihood estimation) using the AMOS 17 software package (Arbuckle, 2008). The goodness-of-fit of the model was assessed with the χ^2 statistic, the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and relative fit indices such as the non-normed fit index (NNFI). For the CFI and NNFI, values of .90 are acceptable, whereas values of .95 or higher are indicative of an excellent fit (Hu & Bentler, 1999). For the RMSEA, values up to .08 represent reasonable errors of approximation (Browne & Cudeck, 1993).

5. Results

5.1. Initial analyses

To determine whether attrition might have biased the representativeness of our sample, we used logistic regression analyses to test whether participation at t3 was predicted by the study variables assessed at t1 (Goodman & Blum, 1996). Indeed, we detected 4 out of 14 study variables that significantly predicted participation at t3: job control ($B = .14$; $SE = .07$; $p < .05$), interpersonal justice ($B = .17$; $SE = .08$; $p < .05$), interruptions at work ($B = .22$; $SE = .07$; $p < .01$), and disengagement ($B = -.35$; $SE = .14$; $p < .05$). Higher levels of control, justice, and interruptions at work seem to decrease the probability of drop-out, whereas higher levels of disengagement seem to increase this probability. Moreover, we evaluated selective drop-out by comparing the demographics of employees who participated in all three waves (N = 1038) with employees who participated at baseline only or at baseline plus one follow-up (N = 1121). Men are slightly overrepresented in the sample that participated in all three waves, as 68.8% were men, compared to 60.5% in the drop-out sample ($\chi^2(1) = 16.23$, $p < .001$). In addition, it appeared that no systematic drop-out had occurred for age (39.40 vs. 39.20 years in the drop-out sample; $t(2144) = -0.42$, n.s.). In sum, it can be concluded that minor selective drop-out occurred regarding gender, three work characteristics, and one aspect of employee well-being.

Table 1 shows the means, standard deviations, and internal consistencies (where appropriate) of all variables included in the study. Note that all scales had reliabilities over .70, which is acceptable, with two exceptions: social support and appreciation. However, both alphas are above .60 and therefore meet what is considered to be a minimum standard. That is Kline (1999) noted that when dealing with psychological constructs values below .70 can realistically be expected due to the diversity of the constructs being measured. In addition, correlations between study variables over time indicated that 1-year stabilities were generally rather high, ranging from $r = .40$ (task significance t1–t3) to $r = .74$ (job control t2–t3).

5.2. Model testing

First, we tested the research model with work engagement (i.e., vigor, dedication, and absorption) as a positive indicator of employee well-being (see Fig. 2). In terms of fit indices, the fit between the data and this model was excellent ($\chi^2(548) = 1506.10$, $p < .001$, CFI = .96, RMSEA = .04; NNFI = .95). The standardized estimates indicate that at each occasion, the change components of job resources and of job demands were significantly related to the change components of work engagement (with the exception of demands t1 and engagement t1 ($\beta = -.13$; $p = .139$, n.s.). It is important to note that the model controls for both time-invariant stable components and levels of changing resources, demands, and engagement at earlier occasions. As hypothesized by the JD-R model, the covariances between changing job demands and changing work engagement were negative and generally lower (on average $r = -.17$) than the covariances between changing job resources and changing engagement (on average $r = .40$). Cross-lagged effects in the work engagement model were not significant (changing resources t1 → changing engagement t2: $\beta = .04$; $p = .763$, n.s.; changing resources t2 → changing engagement t3: $\beta = .09$; $p = .229$, n.s.; changing demands t1 → changing engagement t2: $\beta = -.04$; $p = .625$, n.s.; changing demands t2 → changing engagement t3: $\beta = -.05$; $p = .428$, n.s.).

Table 2 shows that between 49% and 69% of the total variance in job resources and between 34% and 35% of the total variance in job demands were accounted for by the corresponding stable components, whereas this percentage for work engagement ranged between 54% and 66%.

Next, we tested the same model but this time with burnout as a negative indicator of employee well-being, i.e., exhaustion and disengagement (see Fig. 3). Whereas the fit indices were slightly lower than for the engagement model, the fit with the data was

good ($\chi^2(453) = 1646.9$, $p < .001$, CFI = .93, RMSEA = .05; NNFI = .91). The results in Table 2 show that between 49% and 67% of the variance of job resources and 30% of the variance of job demands were accounted for by the stable component; for burnout this was between 40% and 45%.

Similar to the previous model, at each occasion the change components of job resources and job demands were significantly related to the change components of burnout. Again, the model controls for the effects of the stable components and for the levels of demands, resources, and burnout at previous occasions. All covariances between job resources and job demands on the one hand and burnout on the other hand were high and significant. The nature of the co-variance agreed with the predictions of the JD-R model; relations of burnout with demands were positive and with resources were negative. For burnout, we did not find major differences in the strengths of relationships with demands (on average .61) versus resources (on average −.61). Hence, in essence, the relationships of job resources and job demands with burnout were equally strong, albeit in opposite directions. In this model, contrary to the engagement model we failed to model all assumed cross-lagged linkages because including four cross-lagged linkages between job demands, job resources and burnout yielded a Heywood case. Therefore we only modeled the two cross-lagged effects from job demands on burnout, which were not significant either (job demands t1 → burnout t2: $\beta = .06$, $p = .633$; n.s.; job demands t2 → burnout t3: $\beta = .04$, $p = .635$, n.s.)

The findings of both models indicated that job resources were more stable (between 48 and 69%) than job demands (between 30 and 35%). Moreover, stable demands and stable resources shared about two third of their variance (64%, $\beta = -.80$, $p < .001$, and 71%, $\beta = -.84$, $p < .001$, respectively; see Figs. 2 and 3). A comparison of both models reveals further interesting findings. First, the paths between the changing components of burnout across occasions were consistently larger than those of engagement. Hence, more variance is explained in changing levels of burnout than in changing levels of engagement (up to 61% in burnout compared to 46% in engagement). Moreover, paths between the stable components in the engagement model (stable resources-stable engagement: $\beta = .49$, $p < .001$,

Table 1
Means (M), Standard Deviations (*SD*), and Internal Consistencies (Cronbach's α) of the Study Variables (N = 1038).

		M	*SD*	Cronbach's α	Correlation – t2	Correlation – t3
t1	Social support	4.04	0.73	.68	.45*	.45*
	Job control	3.86	0.73	.85	.70*	.66*
	Task significance	3.54	1.12	Single item	.41*	.40*
	Appreciation	5.26	0.78	.63	.53*	.44*
	Interpersonal justice	4.28	0.67	.82	.52*	.42*
	Interruptions	3.44	0.78	.76	.66*	.60*
	Time pressure	3.25	0.79	.76	.64*	.57*
	Uncertainty at work	2.56	0.71	.74	.59*	.52*
	Qualitative overload	2.07	0.68	.79	.62*	.53*
	Exhaustion	2.16	0.49	.82	.61*	.50*
	Disengagement	1.89	0.44	.75	.59*	.50*
	Vigor	3.93	1.07	.79	.62*	.56*
	Dedication	4.12	1.17	.89	.62*	.55*
	Absorption	3.93	1.19	.86	.62*	.57*
t2	Social support	4.01	0.75	.68		.54*
	Job control	3.86	0.71	.85		.74*
	Task significance	3.54	1.02	Single item		.55*
	Appreciation	5.22	0.81	.64		.58*
	Interpersonal justice	4.25	0.68	.81		.59*
	Interruptions	3.39	0.73	.74		.70*
	Time pressure	3.13	0.79	.78		.69*
	Uncertainty at work	2.54	0.71	.77		.61*
	Qualitative overload	1.98	0.67	.81		.64*
	Exhaustion	2.12	0.51	.84		.65*
	Disengagement	1.91	0.44	.76		.64*
	Vigor	3.94	1.10	.81		.66*
	Dedication	4.09	1.15	.88		.66*
	Absorption	3.95	1.17	.88		.68*
t3	Social support	3.96	0.76	.69		
	Job control	3.83	0.74	.85		
	Task significance	3.49	1.06	Single item		
	Appreciation	5.20	0.83	.63		
	Interpersonal justice	4.24	0.69	.81		
	Interruptions	3.38	0.74	.76		
	Time pressure	3.17	0.81	.77		
	Uncertainty at work	2.55	0.71	.78		
	Qualitative overload	1.95	0.66	.81		
	Exhaustion	2.13	0.53	.84		
	Disengagement	1.95	0.456	.77		
	Vigor	3.85	1.16	.83		
	Dedication	4.01	1.24	.90		
	Absorption	3.85	1.24	.90		

* $p < .001$.

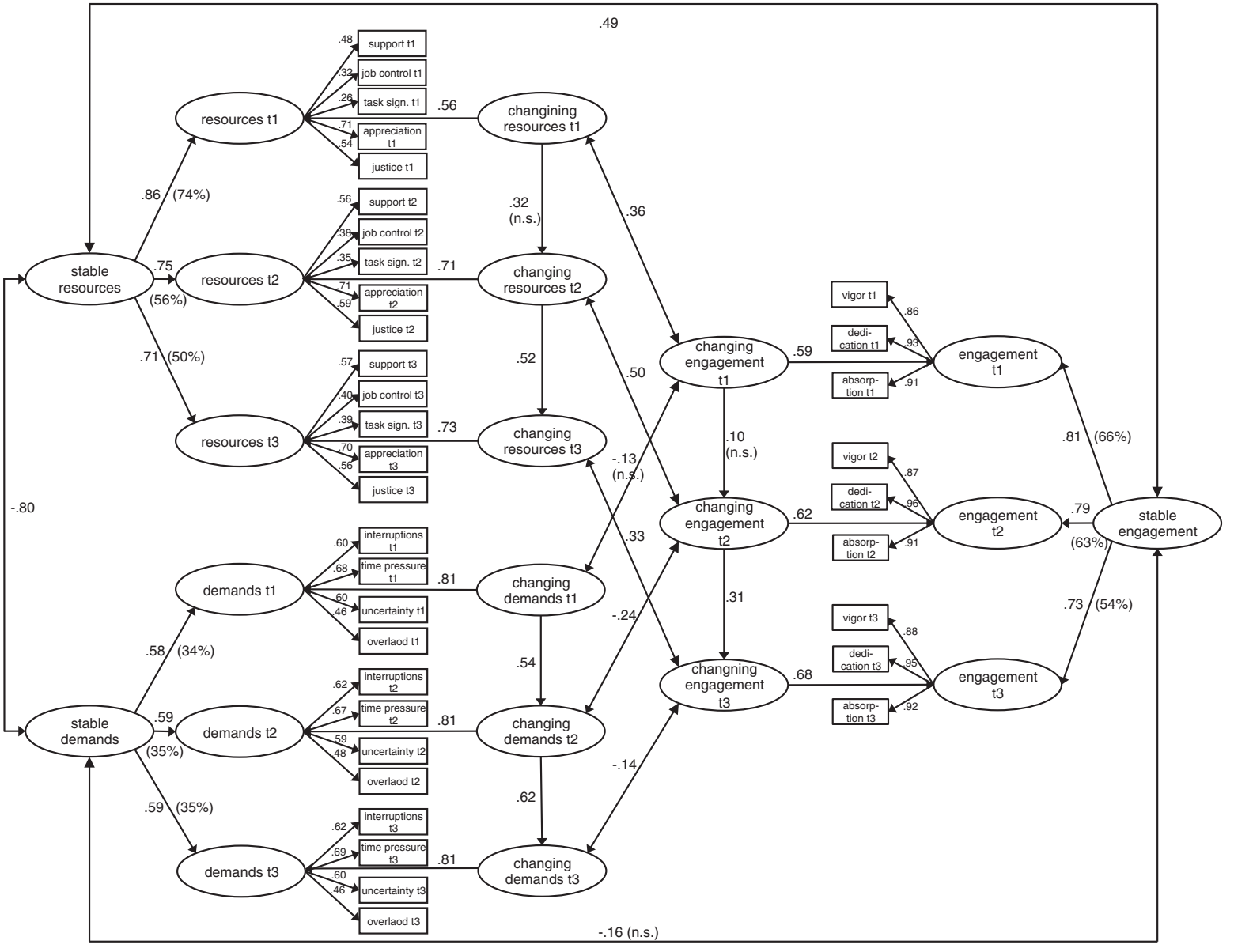

Fig. 2. The stability and change model with work engagement (standardized solution; N = 1038). For reasons of clarity, cross-lagged effects are not displayed.

stable demands-stable engagement: $\beta = -.16$, $p = .090$) were considerably lower than those between stable components in the burnout model (stable resources–stable burnout: $\beta = -.89$, $p < .001$, stable demands–stable burnout: $\beta = .92$, $p < .001$).

6. Discussion

In this study we followed two main objectives: The first objective was to determine the degree of stability across a 3-year period of each of the core components of the JD-R model, namely, job resources, job demands, work engagement, and burnout. The second objective was to estimate the strength of the relationships between job resources and job demands on the one hand and burnout and work engagement on the other hand, controlling for the stable component as proposed by the stability and change model (Heady & Wearing, 1989; Ormel & Schaufeli, 1991). This approach made it possible to disentangle the stable and changing components of the core elements of the JD-R model.

The first objective was met by testing two separate structural equation models, one with work engagement (Fig. 2) and one with burnout (Fig. 3) as the outcome measure. Values in Table 2 showed that the amount of stability of job resources was approximately 50% (except for t1 when values were even higher), whereas for job demands the stability was much lower, at approximately one third. Moreover, it appeared that around 60% of the variance in work engagement was accounted for by a stable component. Finally, for burnout, these percentages were around 45%. Thus, both models indicated that job resources are more stable in nature than job demands, and, furthermore, work engagement turned out to be more stable than burnout. Taken together this means that positive is more stable than negative.

The second objective, i.e., identifying similar relationship patterns between job characteristics and work-related well-being as hypothesized by the JD-R model and found in common longitudinal studies, was met by using the same two structural equation models (see Figs. 2 and 3). Indeed, despite the fact that we controlled for stability, we found a similar pattern to the pattern previously found in cross-sectional as well as in longitudinal studies on the JD-R model (see Schaufeli & Taris, in press): Job demands and job resources are both associated with burnout, even though the relationship between job resources and burnout is stronger than usually found (e.g., Hakanen et al., 2006). However, cross-lagged effects were not significant. Even though these effects were modeled it is not very astonishing that they turned out to be non-significant, especially when there is a time interval of 1 year, as in this study. According to the dynamic equilibrium model, lagged effects between the variables controlled for stability are not very likely to be observed, since the model assumes that external forces are dealt with by internal adaptive mechanisms becoming active after a certain time that cause levels of well-being to return to their characteristic levels (Schaufeli et al., 2011). In consequence, that means that the stability and change model produces very conservative estimates.

In sum, our findings first indicate that positive perceptions, experiences, and characteristics at work (i.e., job resources and work engagement) are more stable compared to their negative counterparts (i.e., job demands and burnout). How can this difference be explained? The explanation for the difference in stability might lie in the core assumption of the dynamic equilibrium model (Heady & Wearing, 1989) that current levels of demands, resources and well-being are influenced by environmental changes, i.e., external forces, that act to deflect symptom levels from their stable, characteristic level. Internal adaptive mechanisms tend to neutralize these effects by restoring the characteristic level. However, it might be speculated that these adaptive mechanisms work less effectively for negative environmental changes than for positive ones. This reasoning is supported by the finding that the impact of negative events (or external forces) on individuals is stronger than the impact of positive events, i.e., when equal measures of positive and negative are present, the effects of the negative events overweigh the effects of the positive ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). For instance, according to Fredrickson and Losada (2005), it takes about *three* positive events to offset the effect of *one* negative event. In other words, negative events are more impactful than positive events, so that the dynamic equilibrium is more difficult to attain for negative events than for positive events. This results in more stability for positive experiences as compared to negative experiences. This reasoning holds for both well-being outcomes (work engagement and burnout) as well as for the work characteristics (job resources and job demands). The negative aspects of work (i.e., job demands) seem to be more strongly determined by external forces (see Figs. 2 and 3: regression weights from the changing components on the observed latent variables), which might be also explained by the stronger influence of negative events (which might affect job demands stronger than job resources) compared to positive ones (see above). Besides, the examined resources refer to general job content (task significance) and nature of social relationships (social support, appreciation, interpersonal justice), which in general can be assumed to be more stable and more independent from changes in work environment, whereas the examined demands (time pressure, interruptions, uncertainty, overload) might respond immediately to changes in work

Table 2
Stability at t1, t2, and t3 in job resources, job demands, work engagement, and burnout (N = 1038).

	Stability		
	t1	t2	t3
Job resources	69%[a]/67%[b]	49%[a]/49%[b]	48%[a]/49%[b]
Job demands	34%[a]/30%[b]	35%[a]/30%[b]	35%[a]/30%[b]
Work engagement	66%	63%	54%
Burnout	44%	45%	40%

[a] In the model with work engagement as outcome.
[b] In the model with burnout as outcome.

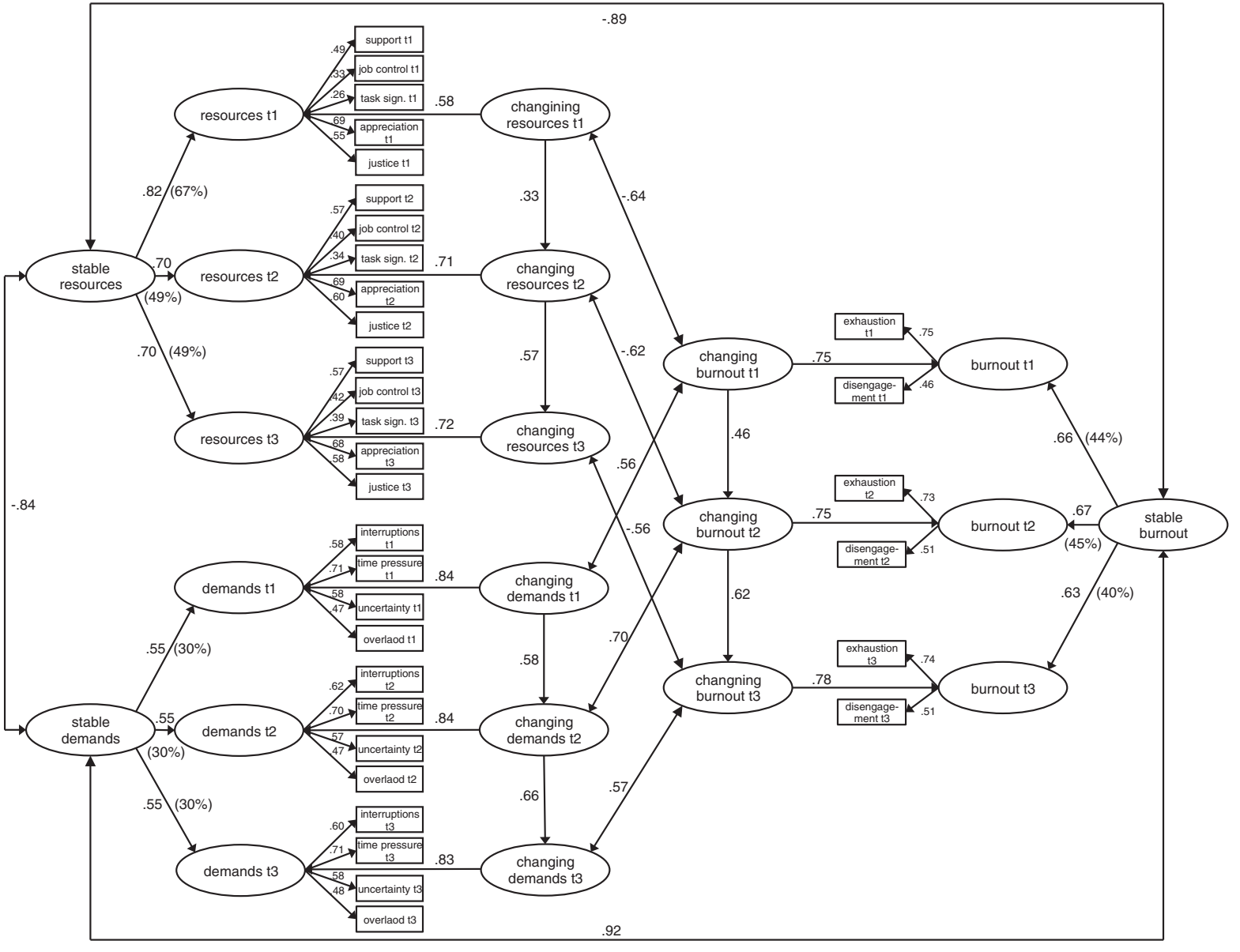

Fig. 3. The stability and change model with burnout (standardized solution; N = 1038). For reasons of clarity, cross-lagged effects are not displayed.

environment, such as increased workload or economic crisis, imposed on employees, in particular since the study was conducted in time of serious economic changes.

Second, our results showed (see Table 2 and in Figs. 2 and 3) that stability levels of job resources varied decisively over time (between 49% and 69%). One might legitimately expect that these values do not change across time, since they are determined by stable personality traits (such as negative or positive affectivity) and by stable environmental conditions (such as organizational culture or work conditions). However, as we know from additional qualitative interview data from the employees who participated in this study and from the project managers in the participating organizations, in the year between the baseline measurement and the first follow-up, there were substantial changes in the structure of units and management culture. These changes might explain the difference in levels of stability in job resources, because the resources that were included in this study (i.e., social support, appreciation, and interpersonal justice) are particularly sensitive to changes in teams and management.

Third, we found that the stability of burnout was higher (40–45%) in this study than that observed by Schaufeli et al. (2011), who used a similar stability and change model and revealed that about one quarter was accounted for by a stable component. The reasons for this might lie on the one hand in the larger time intervals (5 years in their study versus 1 year in our study) and on the other hand in the operationalization of burnout. Whereas in our study burnout was measured by the OLBI, the study by Schaufeli et al. (2011) used the Maslach Burnout Inventory (Maslach et al., 1996). A relevant difference between these two measures with regard to the deviant findings is the fact that the OLBI includes also positively formulated items, which are reversely scored in order to calculate a scale score. Thus, the OLBI includes positive aspects (which are found to be more stable; see above), so it is reasonable to assume that the stable component of burnout as measured by OLBI is higher than burnout measured by the Maslach Burnout Inventory as in Schaufeli et al. (2011).

We found fourthly a similar pattern as it was previously found in cross-sectional as well as in longitudinal studies on the JD-R model (see Schaufeli & Taris, in press), with the exception of job resources which are stronger related to burnout than usually found. The reason for this could also lie in the operationalization of burnout by the OLBI, since this instrument, as mentioned above, also includes positively worded items. Furthermore, the covariances between job demands and work engagement are negative and lower than those between job resources and engagement, which is in line with the assumptions of the JD-R model (Schaufeli & Taris, in press).

Fifth, study findings indicated that, in general, more variance is explained in changing levels of burnout than in changing levels of engagement (because the paths to burnout are stronger than to engagement and the explained variances are higher in the burnout model). This means that variables other than those included in the model play a role in explaining engagement, i.e., the model suits better for burnout. Or put differently, it might be that better, i.e., more relevant and appropriate, job demands are included in our study as compared to the resources. For instance, studies on the JD-R model have consistently shown that opportunities for learning and development, and performance feedback are among the most significant resources for the majority of employees (see Bakker & Demerouti, 2007). However, these variables were not included in this study. Besides, another reason might lie in the fact that the changing proportion of work engagement is lower than the changing proportion of burnout, therefore, overall, less can be explained.

Finally, a comparison between the two models shows that the stable component of burnout is more strongly related to stable job resources and job demands than the stable component of engagement is to stable resources and demands (analogous to the relationships between the changing components). This finding indicates that work characteristics and burnout are determined by the same source of stability. In contrast, there might be different sources of stability that influence job resources, job demands, and burnout on the one hand and work engagement on the other. We can only speculate about the nature of these sources (different kinds of personality traits or different environmental conditions). Future research should include stable personality and stable environmental variables in order to elucidate this issue.

6.1. Study limitations and directions for future research

The unique strength of this study is the application of a stability and change model for investigating the JD-R model. This stability and change model is superior to common longitudinal analysis strategies, since it not only controls for time stability (i.e., for previous occasions) but also for the stable, time-invariant components of job resources, job demands, and employee well-being. Nevertheless, this study also has some limitations. First, our initial analyses showed that there is a potential threat of drop-out biasing the results. However, it seems that the more problematic employees dropped out (particularly those with lower job resources and less well-being). So it seems that this is a rather classic healthy worker effect, first described by McMichael (1976).

A second limitation is that we can only speculate about the nature of the stable components determining job demands, job resources, burnout, and engagement. Basically, the stability component in our model reflects the proportion of variance that remains stable across time and does not reveal the nature of this stability. That stability might be caused by a steady, unchanging environment and/or by personality factors (Ormel & Schaufeli, 1991; Schaufeli et al., 2011). Especially for examination of the different levels of stability in positive and negative working environments, future research should include personality factors like positive and negative affectivity that are known to play a role in the stability of work-related concepts such as job satisfaction (Dormann et al., 2006) and employee well-being (Schallberger, 2006), but also stable environmental factors such as organizational culture.

Third, we encountered problems with testing the model including both, work engagement and burnout. As Schaufeli et al. (2011) stated, one should realize that stability and change models extract extensive information from a limited data source. By attempting to fit the model including work engagement and burnout to our data, we reached the limits of the method, unfortunately yielding an unstable solution.

A final limitation is related to the weakness of some of the measures. In particular, job resources were measured with several weak items, namely, the single item "task significance" as well as the "social support" and "appreciation" scale with somewhat low Cronbach's α values.

7. Conclusion

Despite these limitations, this 3-wave study contributes to our current knowledge by successfully disentangling the stable and changing components of each aspect of the JD-R model, thereby applying the notion of a dynamic equilibrium of stability and change (Heady & Wearing, 1989; Ormel & Schaufeli, 1991) to the JD-R model. We identified, for the first time, the degree of stability in job resources, job demands, work engagement, and burnout, which is indisputably important when planning, implementing, and evaluating health promoting interventions in organizations. Moreover, by investigating the relationship patterns between changing job resources, changing job demands, and changing employee well-being, we also strengthened the validity of the assumptions of the JD-R model.

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