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Stability and change model of job resources and work engagement: A seven-year three-wave follow-up study

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Using the stability and change model, conservation of resources theory and the job demands-resources model, this study aimed to determine: (1) the extent to which work engagement and job resources can be explained by a component reflecting stability and a component reflecting change in these constructs, and (2) the strength and direction of the relationship between work engagement and job resources when their stable components are controlled for. The study was carried out among 1,964 Finnish dentists over a seven-year time period (2003–2010), using a three-wave dataset. Some of the dentists had changed jobs during the follow-up, and therefore the research questions were validated among groups of job stayers and job changers. The stability and change models were examined using structural equation modelling. The results showed that 69–77% of the variance of dentists' work engagement, and 46–49% of the variance of job resources was explained by the component reflecting stability. However, although there was a positive relationship between job resources and work engagement, the primary direction of this relationship could not be determined. Either job resources or work engagement may be considered as the initiator of this relationship. Job change did not affect the results.

Keywords: Work engagement; Job resources; Stability and change model; Longitudinal; Job change; Dentists.

Work engagement has become a popular construct in the field of positive occupational health psychology (for reviews, see, e.g., Albrecht, 2010; Bakker & Leiter, 2010). The proliferation of work engagement research has produced valuable longitudinal studies, which have shown that work engagement is a highly stable phenomenon; feelings of work engagement are quite permanent and long-lasting (e.g., Hakanen, Peeters, & Perhoniemi, 2011; Mauno, Kinnunen, & Ruokolainen, 2007; Schaufeli, Bakker, & Van Rhenen, 2009; Seppälä et al., 2009). However, recent longitudinal studies have also shown that psycho-social job resources are positively related to work engagement over time (for a review, see, Mauno, Kinnunen, Mäkikangas, & Feldt, 2010), and that the relationship between work engagement and job resources can also be reversed or reciprocal (e.g., De Lange, De Witte, & Notelaers, 2008; Hakanen, Perhoniemi, & Toppinen-Tanner, 2008; Simbula, Guglielmi, & Schaufeli, 2011; Weigl et al., 2010; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Therefore, not only may job resources influence work engagement, but work engagement may influence job resources over time.

In this study we focused on these two issues: stability and the relationships between work engagement and job resources. However, we take a wider theoretical perspective and a further step methodologically than previous longitudinal studies by utilizing the stability and change model (Ormel & Schaufeli, 1991; see also Headey & Wearing, 1989). This model partitions the amount of variance in work engagement and job resources that is accounted for by a stable component (i.e., trait component) and a remaining change component. Therefore, we can estimate the strength and direction of the relationship between job resources and work engagement, after controlling for stable components. The first aim of the study was to investigate the amount of variance explained by the stable components of work engagement and job resources (i.e., role clarity, supervisory support, positive organizational climate and innovative climate) among Finnish dentists (n = 1,964) over a seven-year time period with a three-wave dataset. The second aim was to

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investigate the strength and direction of the relationship between work engagement and job resources after controlling for their stable components. We also investigated these research questions among both dentists who had changed jobs and those who had stayed in the same workplace over the whole study period.

DYNAMIC EQUILIBRIUM OF WORK ENGAGEMENT AND JOB RESOURCES

To date, different statistical latent trait-state covariance models have been developed to separate stable (i.e., trait) versus change (i.e., situational circumstances) factors, explaining the actual level (i.e., state) of a construct at a particular point of time (for a review, see, Cole, Martin, & Steiger, 2005). In this study we utilize the stability and change model (Ormel & Schaufeli, 1991), which is based on the idea of the dynamic equilibrium model developed by Headey and Wearing (1989). The dynamic equilibrium model was originally developed to examine subjective well-being, and has thus far only rarely been utilized to examine well-being at work (e.g., Brauchli, Schaufeli, Jenny, Füllemann, & Bauer, 2013; Schaufeli, Maassen, Bakker, & Sixma, 2011). One reason for this could be that this rather complex statistical model requires a longitudinal study with at least three measurement points (Ormel & Schaufeli, 1991).

Following the dynamic equilibrium model (Headey & Wearing, 1989), each individual has a stable equilibrium level (i.e., a trait-level) of subjective (or work-related) well-being and a pattern of life events (or job characteristics), both of which are based on stable personal characteristics (e.g., personality) and stable environmental conditions (e.g., stable economic and social environment). The model further assumes that environmental changes, such as external job change or promotion may cause a deviation from the stable, characteristic equilibrium levels. However, internal adaptive processes (e.g., individual ways of coping) try to ensure that the equilibrium level is sustained, and thus the influences of the environmental changes are usually only temporary. The stronger these individual, adaptive processes are, the less influence environmental forces have (Headey & Wearing, 1989). Thus, if the extent of the equilibrium level of work engagement is large, job resources must be considerable and long-lasting in order to cause deviations from the habitual level of work engagement. From the perspective of developing work engagement, it is essential to know how easy or difficult it is to change this phenomenon.

STABILITY OF WORK ENGAGEMENT AND JOB RESOURCES—PREVIOUS RESULTS

Theoretically, work engagement—a positive, work-related affective-motivational state of mind, is considered a long-lasting and pervasive mental state (Schaufeli & Bakker, 2010; Schaufeli, Salanova, González-Romá, & Bakker, 2002). Indeed, previous longitudinal studies have consistently demonstrated the stability of work engagement (see Table 1). The stability coefficients in these longitudinal studies varied from .59 to .81 over time, indicating that 35–66% of the variance of work engagement can be explained by the level of work engagement on the previous occasion. These stabilities are based on studies with time-lags ranging from one to seven years, and on test–retest correlations between sum scores or standardized stability coefficients between the latent factors of work engagement estimated by structural equation modelling (SEM).

However, the stability of work engagement seems to depend to some extent on the timeframe within which it is measured. Results of follow-up studies with shorter time-lags, from a few days to a few weeks, have shown that work engagement actually fluctuates within these short periods of time (e.g., Bakker & Bal, 2010; Sonnentag, 2003; Xanthopoulou, Baker, Heuven, Demerouti, & Schaufeli, 2008; see also Sonnentag, Dormann, & Demerouti, 2010). Thus, it seems there are days and weeks during which employees experience stronger work engagement; for example, on some days a supervisor may provide more support and feedback and thus affect employees' work engagement. Nevertheless, despite these brief, temporary fluctuations, work engagement seems to return to its usual level over longer periods of time.

Furthermore, the stability coefficients of work engagement do not really decrease over time, although stability is in general expected to do so (e.g., Jöreskog, 1970). This indicates that work engagement has a time-invariant component that remains constant even over several time periods (see also trait-like work engagement; Sonnentag, 2003; Sonnentag et al., 2010). This component could explain why, despite brief and temporary fluctuations, work engagement seems to return to its usual level over a longer period of time (Headey & Wearing, 1989; Ormel & Schaufeli, 1991; see also Schaufeli et al., 2011).

A review of the longitudinal studies on work engagement (see Table 1) showed that in addition to work engagement, the perceptions of job resources also remained rather stable over time. For instance, the observed stabilities (i.e., test–retest correlations between sum scores) of autonomy, support from colleagues and one's supervisor, and departmental resources during a 16-month follow-up among Belgian workers varied from .60 to .70 (De Lange et al., 2008). In a similar vein, a three-wave study among Italian schoolteachers at four-month intervals showed that the stabilities for various job resources (opportunities to learn and to develop, co-workers' support and supervisor support) ranged from .73 to .76 (Simbula et al., 2011). The stability coefficients for autonomy and positive social relationships using SEM varied from .54 to .59 in a three-wave study among German

TABLE 1
Summary of longitudinal work engagement studies

Authors and publication year	*Participants and study design*	*Measure of work engagement*	*Statistical analyses*	*Rank-order stability for work engagement*
De Lange et al. (2008)	Belgian employees from different sectors (n = 871; 53.5% females). Two-wave design with 16-month time lag	Vigour and dedication subscales of the UWES-9	Correlation coefficient between sum scores of work engagement	r = .71
Hakanen et al. (2011)	Finnish dentists (n = 1,632; 72.4% females). Two-wave design with three-year time lag	All subscales of the UWES-17	Latent factor of work engagement in SEM models	β for different SEM models and for different genders varied from .71 to .77
Hakanen, Perhoniemi, et al. (2008)	Finnish dentists (n = 2,555; 73.5% females). Two-wave design with three-year time lag	All subscales of the UWES-17	Latent factor of work engagement in SEM models	β for two different SEM models were .67 and .72
Hakanen and Schaufeli (2012)	Finnish dentists (n = 1,964; 76% females). Three-wave design with seven-year time-lag	All subscales of the UWES-17	Latent factor of work engagement in SEM models	β between T1 and T2 .78, and between T2 and T3 .77
Hakanen, Schaufeli, et al. (2008)	Finnish dentists (n = 2,555; 73.5% females). Two-wave design with three-year time lag	Vigour and dedication subscales of the UWES-17	Latent factor of work engagement in SEM models	β for two different SEM models were .71 and .78
Mauno et al. (2007)	Finnish health care personnel (n = 409; 88% females). Two-wave design with two-year time lag	All subscales of the UWES-17	Dimension specific correlation coefficients	Vigour, r = .73; dedication, r = .67; absorption r = .69
Schaufeli et al. (2009)	Telecom managers (n = 201, 89% males). Two-wave design with one-year time-lag	Vigour and dedication subscales of the UWE-17	Latent factor of total work engagement in SEM models	β = .68
Seppälä et al. (2009)	Finnish dentists (n = 2,555; 73.5% females). Two-wave design with three-year time lag	All subscales of the UWES-9	Latent factor of work engagement in SEM models	β for vigour .85, for dedication, 86, and for absorption .82
Simbula et al. (2011)	Italian school teachers (n = 104; 90% females). Three-wave study with approximately four-month time lags	Vigour and dedication subscales of the UWES-9	Correlation coefficients between sum scores of work engagement	T1 and T2, r = .81; T2 and T3, r = .78; T1 and T3, r = .80
Weigl et al. (2010)	German medical doctors (n = 416; 51% males). Three-wave study design with 14- and 19-month time lags	All subscales of the UWES-9	Latent factor of work engagement in SEM models	β between T1 and T2 .59, and T2 and T3 .64
Xanthopoulou et al. (2009)	Dutch employees working in electrical engineering and electronics company (n = 163; 80% males). Two-wave design with average 18-month time lags	All subscales of the UWES-9	Correlation coefficient between sum scores of work engagement	r = .70

hospital physicians at measurement intervals of 14 and 19 months, respectively (Weigl et al., 2010). Similarly, longitudinal studies of Finnish dentists, using SEM methods and a three-year time-lag, found the stabilities of dentists' specific job resources (craftsmanship, pride in the profession, and direct and long-term results) to be over .70 (Hakanen et al., 2011; Hakanen, Perhoniemi, et al., 2008; Hakanen, Schaufeli, & Ahola, 2008). Taken together, the perceptions of job resources seem to be moderately stable, but these stabilities are generally lower than those of work engagement.

RELATIONSHIP BETWEEN JOB RESOURCES AND WORK ENGAGEMENT

The theoretical framework most often used when investigating the relationship between job resources and work engagement is the *Job-Demands-Resources (JD-R) model* developed by Demerouti, Bakker, Nachreiner, and Schaufeli (2001) (see also Bakker & Demerouti, 2007; Demerouti & Bakker, 2011). According to the JD-R model, job resources refer to the physical, psychological, social or organizational aspects of a job that (1) may reduce job demands, (2) are needed to achieve work goals and (3) stimulate personal growth, development and learning. Furthermore, job resources are assumed to have motivational potential and to lead to positive work-related outcomes, especially to work engagement, and in consequence also, for example, to improved performance and organizational commitment (e.g., Bakker & Demerouti, 2007; Hakanen & Roodt, 2010).

In addition, according to another widely used theoretical framework in work engagement research, the *Conservation of Resources theory* (COR theory; Hobfoll, 2001), individuals try to protect, maintain and foster (job) resources that are either valuable in their own right or important for attaining future (work) goals. The COR theory also suggests that having (job) resources is linked to having other (job) resources in the future, which may in turn lead to an accumulation of reciprocal "gain cycles or spirals" (Hobfoll, 2001; see also Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010). Therefore, according to the COR theory, the relationship between job resources and work engagement could be positive and reciprocal, meaning that they influence each other mutually; gaining job resources improves work engagement, which in turn leads to gaining additional job resources.

To date, some longitudinal evidence exists of the normal causality assumption, which is in line with the JD-R model and posits that work-related resources are positively related to work engagement over time. Previous studies have found, for example, that autonomy and skill variety have positive longitudinal effects on work engagement (De Lange et al., 2008; Hakanen, Schaufeli, et al., 2008). Furthermore, recent longitudinal studies utilizing a two- and even a three-wave dataset have verified the assumptions of the COR theory and provided evidence of reversed causal relationships; that is, work engagement predicts job resources (De Lange et al., 2008), and of reciprocal causal relationships, that is, job resources predict work engagement, which, in turn predicts job resources (e.g., Hakanen et al., 2011; Hakanen, Perhoniemi, et al., 2008; Schaufeli et al., 2009; Simbula et al., 2011; Weigl et al., 2010; Xanthopoulou et al., 2009). These studies have shown, for instance, that work engagement is positively related to job resources such as autonomy, social support and developmental opportunities over time, which in turn are positively related to work engagement over time.

However, the expected motivational associations between job resources and work engagement have not been as strong as expected on the basis of the propositions of the JD-R model (see Hakanen & Roodt, 2010). This is an indication that some other factors in addition to job resources (e.g., previous measurement time and the time-invariant stability of work engagement) also influence work engagement. Furthermore, the strength of the relationships varies to quite an extent (regression coefficients between latent factors varied from about .10 to about .70), depending on whether the previous measurement times of job resources and work engagement were controlled for. When they were controlled for, there was obviously less room for the relationship (e.g., Hakanen et al., 2011; Hakanen, Perhoniemi, et al., 2008; Schaufeli et al., 2009; Weigl et al., 2010). Thus, it is important to determine whether and in which direction the relationship between job resources and work engagement remains after controlling for the stable components of the constructs.

STABILITY AND CHANGE MODEL OF WORK ENGAGEMENT AND JOB RESOURCES

Following the stability and change model (Ormel & Schaufeli, 1991) work engagement is considered a latent construct that is measured at three different time points (T1–T3) by three observed variables: vigour, dedication and absorption (see Figure 1). Furthermore, it is assumed that the actual level of work engagement at a particular time point can be divided into two uncorrelated latent factors: a characteristic, stable factor, reflecting the stability and trait-like properties of work engagement over time, and an occasional change factor, representing temporary changes in work engagement at a particular time point. These two components together explain all the variance in the actual level of work engagement. The stability and change model also assumes that the change factors are influenced by the change factors of previous measurement times, representing dynamic equilibrium processes and the effects of adaptive mechanisms over time (Ormel & Schaufeli, 1991; see also Headey & Wearing, 1989). Thus, using the stability and change model, it is possible to separate the stable and change variance in work engagement, and to determine and exclude the extent of the stable variance.

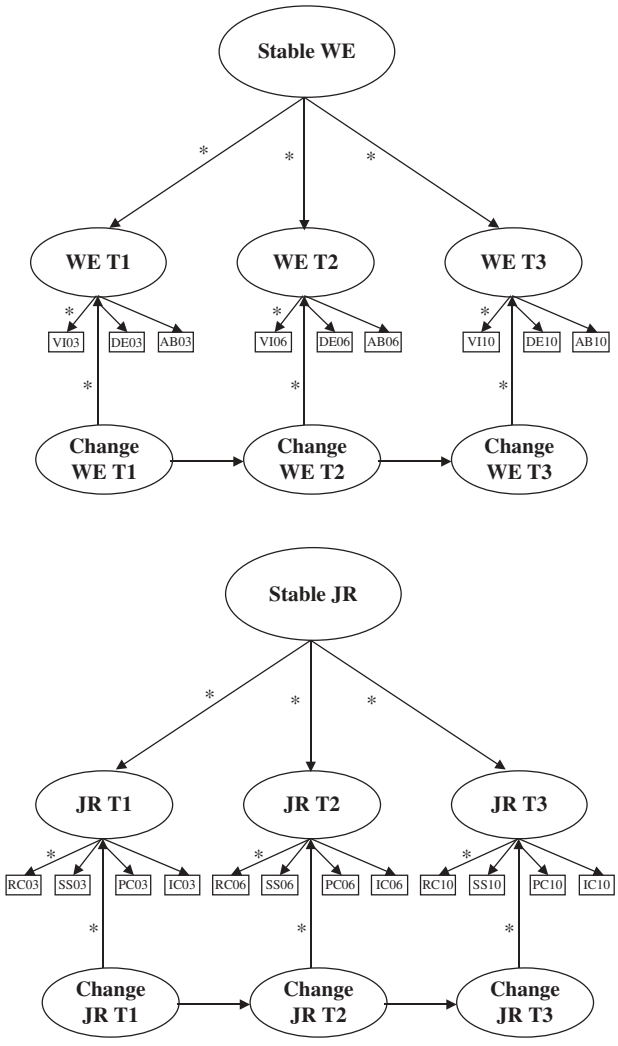

Figure 1. Stability and change models for work engagement (above) and job resources (below). Autocorrelations are omitted for reasons of clarity. * = constrained to 1. WE = Work Engagement; JR = Job Resources.

In addition, following the same logic as that of work engagement, job resources are regarded as a latent construct measured at three different time points (T1–T3) by four observed variables: role clarity, supervisory support, positive organizational climate and innovative climate (see Figure 1). As with work engagement, the actual level of job resources at a particular time point is defined as the sum of two latent factors: the characteristic, stable factor, and the occasional change factor, which are assumed to be influenced by the change factors of previous measurement times.

On the basis of the theoretical assumptions of work engagement and previous longitudinal studies, we hypothesized that:

(H1a) Work engagement is a stable state of mind, and most of its variance is accounted for by the stable component.

(H1b) Although job resources have some stability, they are less stable than work engagement.

We also utilize the stability and change model for the second purpose of the study, that is, to investigate the strength and direction of the relationship between work engagement and job resources. Therefore, both stability and change models are connected by allowing the stable factor of work engagement and the stable factor of job resources to correlate, because the same stable personality traits or a stable work environment are assumed to influence both (Headey & Wearing, 1989; Ormel & Schaufeli, 1991). The change factors of work engagement are further assumed to be influenced by the change factors of job resources and vice versa, because according to the motivating qualities of job resources presented in the JD-R model, the gain cycles proposed in the COR theory and recent longitudinal studies, we hypothesized that:

(H2) The relationship between work engagement and job resources is positive and reciprocal.

According to recent studies, work engagement may increase after job change (e.g., De Lange et al., 2008; Mäkikangas, Schaufeli, Tolvanen, & Feldt, 2013), and the direction of the relationship between job resources and work engagement may be different for job stayers and job changers (De Lange et al., 2008). However, according to the stability and change model, and the idea of dynamic equilibrium, the long, seven-year time lag of this study should restore the stable level of work engagement and job resources, and retain a similar relationship direction, despite a job change. Because many dentists (n = 452) had changed jobs during the measurement period, we tested the extent of the stable and change factors, and the strength and direction of the relationship between work engagement and job resources among groups of job stayers and job changers. These additional analyses were conducted to further investigate and validate the research questions. We hypothesized that:

(H3) The stability of work engagement and job resources, and the relationship between work engagement and job resources is similar for job stayers and job changers.

METHOD

Participants

This study consisted of questionnaire data collected in a seven-year follow-up study (2003–2010) by using three measurement points.[1] The postal questionnaire was sent to every working-aged dentist who was a member of the

[1]All three measurement points of the present dataset have only been used in one earlier study (Hakanen & Schaufeli, 2012).

Finnish Dental Association (FDA) at the time the data was first gathered in 2003. In 2003, a total of 3,255 dentists answered the questionnaire, resulting in a response rate of 71%. In 2006, only 2,555 of those identified in the follow-up study (n = 3,035) returned the questionnaire, making the response rate 84%. Finally, in the last wave in 2010, 1,964 out of 2,275 dentists participated in the study (response rate 86%). The three-year (first follow-up) and the four-year (second follow-up) time intervals were based on practical decisions by the FDA and on financial arrangements, and thus could not be influenced by the researchers.

The work environment of dentists in Finland and in other Scandinavian countries is different to that of many other countries. Approximately half of Finnish dentists are employed in the public sector, and the other half works in private sector dental practices. As well as dentists, typical dental workplaces also consist of dental specialists, oral surgeons or orthodontists, dental hygienists and assistants, receptionist(s), equipment maintenance assistant(s) and supervisors (see, e.g., Hakanen, Perhoniemi, et al., 2008).

This study focused on the dentists who participated in the study at all three measurement points (n = 1,964). Most of the participants were women (76%) and 64% of the participants were employed in the public sector. The mean age of the respondents was 44 (SD = 7.9, Range = 23–72). Nearly all (97%) were permanently employed and working full-time (83%). Their job tenure ranged between 0 and 50 years, and the mean was 18 years (SD = 8.4). The majority of the participants (77%) were employed in the same organization throughout the whole follow-up period (2003–2010). Some of the dentists (23%) had changed jobs during the follow-up, but they were still working in dentistry.

A comparison between those who participated at all study points, and those who participated at only T1 (n = 702) or at T1 and T2 but not at T3 (n = 583) revealed only minor differences between the study variables or demographics (i.e., gender and age). First, respondents who participated at all time points showed somewhat greater dedication than those who participated only at T1 (4.9 vs. 5.0, p = .01). Second, women (75.6% vs. 65.6%, at T1 and T2, respectively, $p < .001$) and younger participants (44.4 vs. 47.9 years of age, at T1 and T2, respectively, $p < .001$) were slightly over-represented in the first follow-up. As the participants did not differ on the basis of any other study variables, it seems unlikely that these differences significantly biased our results.

Measures

Work engagement. Work Engagement was assessed using the Finnish version of the Utrecht Work Engagement Scale 9 (Hakanen, 2009; Schaufeli, Bakker, & Salanova, 2006). The scale includes three sub-scales: vigour, dedication and absorption, each of which consists of three items. *Vigour* refers to high levels of energy and mental resilience while working and the willingness to invest effort into one's work, and it was assessed using items such as "At my work, I feel bursting with energy". *Dedication* is characterized by a sense of enthusiasm, inspiration and pride in one's work, and was measured using items such as "I am enthusiastic about my job". *Absorption* refers to being fully concentrated and deeply engrossed in one's work, feelings of happiness when working intensely and the sense of time passing quickly. Absorption was assessed using items such as "I feel happy when I am working intensely". The items were judged on a seven-point rating scale (0 = *never* and 6 = *every day*). The mean total score for the three dimensions of work engagement was calculated as the mean of three items; this was done for each of the three time periods. The internal consistencies are presented in Table 2.

In the current study, we assessed task, interpersonal and organizational job resources in dentistry. Accordingly, we investigated role clarity, supervisory support, positive organizational climate and innovative climate.

Role clarity. Role clarity was measured using the Finnish version of the Nordic Questionnaire for Psychological and Social Factors at Work (QPS Nordic; Dallner et al., 2000). The scale consists of three items, for example, "Do you know what your responsibilities are?". The items were ranked on a five-point scale ranging from 1 = *very seldom or never* to 5 = *very often or always*.

The other three scales measuring job resources were all derived from the Healthy Organization Barometer (HOB), a well-validated questionnaire that is widely used in Finnish organizations (Lindström, Hottinen, & Bredenberg, 2000).

Supervisory support. Supervisory support comprised four items, for instance, "Does your supervisor provide help and support when needed?". The items were rated on a five-point scale ranging from 1 = *hardly ever* to 5 = *very often*.

Positive organizational climate. Positive organizational climate was assessed using three items, such as, "What is the climate in your work unit? … Pleasant and relaxed". The items were ranked on a five-point scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

Innovative climate. Innovative climate consisted of three items, for example, "How often do the following aspects occur in your work? …We continuously make improvements concerning our jobs". The items were rated on a five-point scale ranging from 1 = *hardly ever* to 5 = *very often*.

The mean total scores for the four job resource scales were calculated separately as the mean of their respective items, at each of the three time periods. The internal consistencies for job resources are presented in Table 2.

TABLE 2
Means, standard deviations, internal consistencies, and Pearson correlations of study variables

Variables	*M*	*SD*	*α*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
Time 1																							
1. VI	4.68	1.18	.82																				
2. DE	4.94	1.16	.85	.77																			
3. AB	4.21	1.40	.74	.52	.61																		
4. RC	4.24	.74	.73	.24	.25	.14																	
5. SS	2.81	.95	.81	.19	.18	.11	.37																
6. PC	3.79	.92	.86	.28	.22	.12	.30	.39															
7. IC	3.08	.77	.71	.23	.22	.17	.32	.54	.46														
Time 2																							
8. VI	4.73	1.11	.82	.67	.58	.40	.23	.15	.21	.18													
9. DE	4.86	1.12	.85	.58	.69	.47	.22	.14	.18	.17	.75												
10. AB	4.21	1.35	.75	.41	.46	.60	.14	.09	.07	.12	.52	.60											
11. RC	4.16	.78	.75	.19	.17	.11	.42	.26	.19	.22	.26	.24	.14										
12. SS	2.92	.93	.80	.14	.12	.30	.22	.54	.19	.34	.20	.13	.07	.39									
13. PC	3.72	.94	.85	.22	.17	.09	.23	.21	.39	.21	.31	.25	.15	.35	.39								
14. IC	3.09	.78	.72	.21	.21	.17	.24	.34	.26	.52	.27	.25	.19	.34	.51	.45							
Time 3																							
15. VI	4.68	1.15	.84	.61	.54	.39	.19	.13	.16	.19	.66	.56	.42	.23	.17	.25	.24						
16. DE	4.91	1.12	.85	.53	.63	.46	.19	.12	.13	.18	.57	.69	.49	.21	.13	.20	.24	.77					
17. AB	4.31	1.39	.78	.40	.45	.59	.14	.07	(.04)	.13	.42	.49	.64	.12	.07	.12	.19	.57	.66				
18. RC	4.23	.72	.76	.20	.19	.14	.44	.25	.19	.23	.23	.23	.15	.47	.30	.25	.27	.28	.27	.18			
19. SS	3.00	.91	.81	.11	.80	.10	.16	.41	.14	.29	.12	.11	(.05)	.24	.47	.20	.30	.18	.18	.11	.46		
20. PC	3.82	.85	.85	.19	.16	.09	.18	.20	.36	.23	.22	.20	.10	.22	.23	.44	.31	.29	.26	.15	.38	.40	
21. IC	3.12	.77	.72	.19	.16	.13	.21	.30	.20	.44	.19	.18	.13	.24	.31	.23	.50	.27	.25	.19	.41	.57	.49

VI = vigour; DE = dedication; AB = absorption; RC = role clarity; SS = supervisory support; PC = positive organizational climate; IC = innovative climate. Non-significant correlations are in brackets.

Statistical analyses

The statistical analyses were carried out by SEM using the Mplus statistical package (version 6.0; Muthén & Muthén, 1998–2010). The full information maximum likelihood estimation method was used, which allows the use of all individuals in the data, including those who have missing values for some of the study variables. The parameters of the models were estimated by using maximum likelihood estimation with robust standard errors (MLR). The distributions of some of the study variables were somewhat skewed (i.e., vigour, dedication, absorption and role clarity) but the MLR estimation method is considered to be robust to non-normality (Muthén & Muthén, 1998–2010).

The analyses included four major stages. First, the longitudinal measurement models of job resources and work engagement were estimated separately, and the equality of the factor loadings was tested. This was to ensure the successful operationalization of the underlying latent constructs in the observed sum variables, and to ensure that the scales were interpreted in the same way at the three time points. The longitudinal one-factor models for job resources and work engagement were estimated by setting mean scores (i.e., role clarity, supervisory support, positive organizational climate and innovative climate or vigour, dedication and absorption) measured in the same wave into their own latent factors (i.e., a latent factor of job resources, and a latent factor of work engagement). The latent factors at three different time points (T1–T3) were allowed to correlate. Next, the constrained longitudinal factor models for job resources and work engagement were estimated separately by imposing equality constraints on the corresponding factor loadings across all three measurement times. Finally, the equality of the factor loadings was tested by comparing the constrained longitudinal factor model to the unconstrained longitudinal factor model.

In the second stage, supposing that the factor loadings remained invariant, both constrained longitudinal factor models were utilized to specify the stability and change models (Ormel & Schaufeli, 1991) of job resources and work engagement, and to determine the extent to which the variance is accounted for by stable factor and by change factors. The stability and change models for job resources and work engagement were estimated separately: the actual level of job resources and the actual level of work engagement were loaded on one latent stable factor, representing common variance over the seven-year time period, and on three latent change factors, representing temporary and changing variances at the three investigated time points T1, T2 and T3 (see Figure 1).

In the third stage, these two stability and change models were combined and the normal, reversed or reciprocal relationships between the change factors of job resources and work engagement were estimated in order to determine the strength and direction of the relationship after controlling for the stable factors. The relationships were estimated as follows: First, a normal model was fitted to the data, in which the change factors of job resources influence the change factors of work engagement; i.e., the regression paths leading from the change factors of job resources to the change factors of work engagement were estimated (M1, see Figure 2). Next, a reversed model was fitted to the data, in which the change factors of work engagement influence the change factors of job resources; i.e., the regression paths leading from the change factors of work engagement to the change factors of job resources were estimated (M2, see Figure 2). Finally, a reciprocal model was fitted to the data, in which the change factors of job resources influence the change factors of work engagement and vice versa; i.e., the regression paths illustrated in the two previous models were estimated simultaneously (M3, see Figure 2).

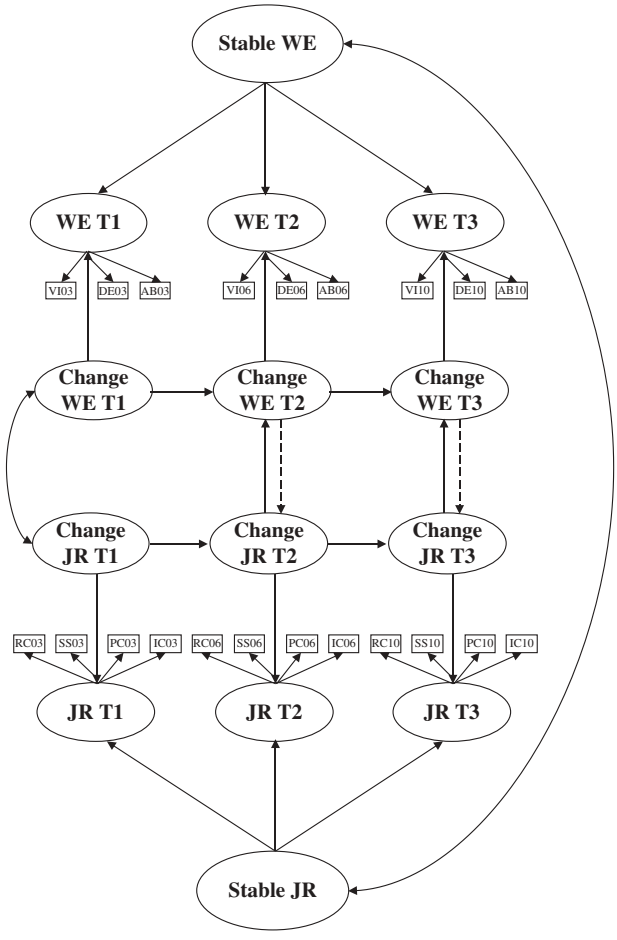

Figure 2. Stability and change model of job resources and work engagement. Continuous regression lines indicate the model with normal relationship (M1) and discontinuous regression lines indicate the model with reversed relationship (M2). Both lines together indicate the model with reciprocal relationship (M3). Autocorrelations are omitted for reasons of clarity. WE = Work Engagement; JR = Job Resources.

In all three models (M1–M3), the relationships between the change factors of job resources at T1 and work engagement at T1 were estimated as a covariance; otherwise, the model would not have been identifiable (e.g., Kline, 2011). Furthermore, the paths leading from the change factors of job resources to the stable factor of work engagement, or from the change factors of work engagement to the stable factor of job resources were not estimated, because—by definition—the stable factor cannot be influenced by temporary and short-term events (Headey & Wearing, 1989; see also Ormel & Schaufeli, 1991). In addition, the cross-lagged effects between the change factors of job resources and work engagement were not estimated, because the dynamic adaptation mechanisms are likely to counteract these effects and to maintain individuals' functioning at the characteristic, stable level (Headey & Wearing, 1989). The models with normal, reversed or reciprocal relationships (M1–M3) were then compared to a saturated structural model (M0, see Figure 3) in which all change factors of job resources and work engagement were allowed to correlate freely with no assumptions of the structural relationships between them. This was to test whether the estimated relationships (normal, reverse and reciprocal) between job resources and work engagement are properly specified and sufficient to determine these relationships (e.g., Anderson & Gerbing, 1988).

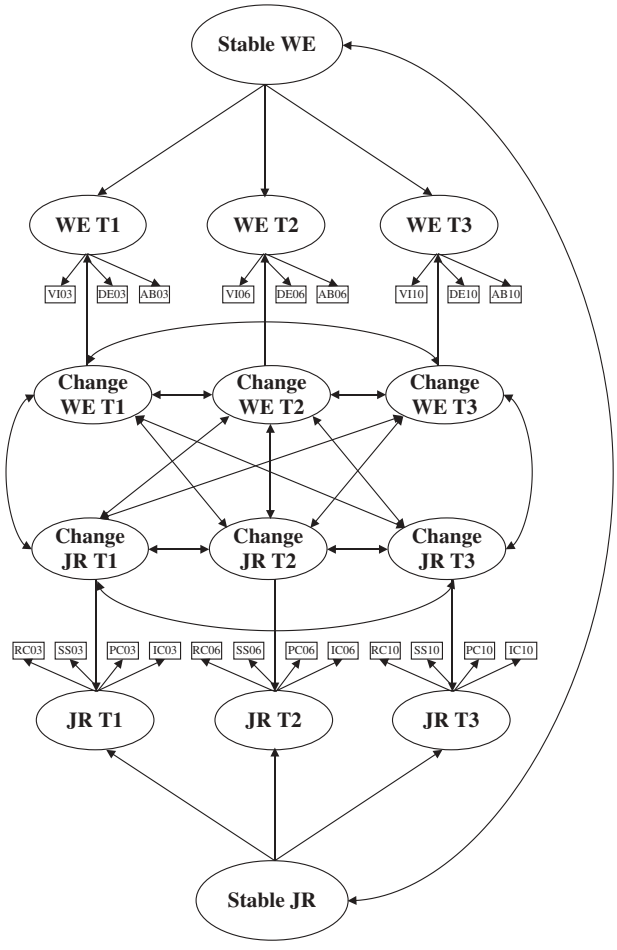

Figure 3. Saturated structural model (M0). Change factors of job resources and work engagement are allowed to correlate freely. Autocorrelations are omitted for reasons of clarity. WE = Work Engagement; JR = Job Resources.

Finally, in the fourth stage, the extent of the variance explained by the stable and change factors of work engagement and job resources, and the models with different relationships (M1–M3) were estimated as a multi-group structural equation model, differentiating between job stayers and job changers.

The fit of the models was evaluated by using several types of fit indices. The appropriateness of the models was assessed using the chi-square test. The overall fit of the models was evaluated using RMSEA (Root Mean Square Error of Approximation; values smaller than .05 indicate a close fit; Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003). The relative fit of the models was evaluated using CFI (Comparative Fit Index) and TLI (Tucker–Lewis index); CFI and TLI values should be greater than .95 to indicate an acceptable fit of model (e.g., Hu & Bentler, 1999; Schermelleh-Engel et al., 2003). The competing nested models were compared using the Satorra–Bentler scaled chi-square difference test (Satorra & Bentler, 2001).

RESULTS

Descriptive statistics

The means, standard deviations, correlations and internal consistencies (Cronbach's alpha) of the study variables are presented in Table 2.

Longitudinal measurement models for work engagement and job resources

Confirmatory factor analysis revealed that the fit of the unconstrained longitudinal one-factor model of work engagement including time-specific residual covariances (i.e., autocovariances) was good (see Table 3). The fit of the constrained model was also good and the chi-square difference test produced a non-significant loss of fit compared with the unconstrained model (see Table 3). Therefore, the equality assumption of the factor loadings was met, and the constrained model was chosen as the basis for the subsequent stability and change model of work engagement. The fit of the unconstrained longitudinal one-factor model of job resources including autocovariances was also good (see Table 3). In addition, the constrained model showed a good fit, and according to the chi-square difference test, the factor loadings remained invariant (Table 3). The constrained model was thus chosen as the basis for the stability and change model of job resources.

TABLE 3
Goodness-of-fit statistics for longitudinal factor models of job resources and work engagement

Stability models	χ^2	*df*	*p*	$\Delta\chi^2(\Delta df)$	*p*	*RMSEA*	*CFI*	*TLI*
1. Unconstrained longitudinal one-factor model of job resources	111.264	39	.000			.031	.987	.978
2. Constrained longitudinal one-factor model of job resources	123.681	45	.000	*2 vs. 1* 12.07 (6)	.06	.030	.986	.979
3. Unconstrained longitudinal one-factor model of work engagement	11.468	15	.718			.000	1.00	1.00
4. Constrained longitudinal one-factor model of work engagement	16.677	19	.611	*3 vs. 4* 5.23 (4)	.26	.000	1.00	1.00

Unconstrained model = freely estimated model; Constrained model = corresponding factor loadings are constrained equal; χ^2 = chi-square test; *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker–Lewis index.

Stability and change models of work engagement and job resources

The fit of the stability and change model of work engagement was very good (see Table 4). In line with the Hypothesis 1a, the model showed that work engagement is a stable state of mind and that most of its variance, 69–77%, is accounted for by the stable factor. Thus, the change factors accounted for 23–31% of the variance of dentists' work engagement. Furthermore, the stability and change model for job resources also showed a good fit with the data (see Table 4). The model demonstrated that 46–49% of the variance of dentists' job resources was accounted for by the stable factor, meaning that 51–54% was accounted for by the change factors. The difference between the stabilities of job resources and work engagement was statistically significant according to the Wald test [χ^2 = 9.65 (1), p =.002]. Hence, in line with Hypothesis 1b, job resources had some stability, but were less stable than work engagement.

Strength and direction of relationship between job resources and work engagement

The fit of the stability and change model with normal relationship (M1) was very good, and the chi-square difference test did not produce a significant loss of fit when compared to the saturated structural model (see Table 4). This indicates that the causal constraints were reasonable and acceptable (see, e.g., Anderson & Gerbing, 1988). Furthermore, M1 revealed that the proportion of the variance of the work engagement change factors explained by the job resources change factors was approximately 10% at both measurement times T2 and T3 (see Figure 4).

Furthermore, the stability and change model with a reversed relationship (M2) also fitted the data well (see Table 4). According to the chi-square difference test, M2 showed no significant loss of fit compared to the saturated structural model, which indicates that the reversed causal constrains were also reasonable and acceptable (e.g., Anderson & Gerbing, 1988). The change factors of work engagement positively influenced the change factors of job resources at the same measurement time, and the size of these paths was very similar to those of M1: the amount of the variance explained ranged between 8% (T2) and 9% (T3). In addition, both M1 and M2 showed that the stable factors of job resources and work engagement shared 21% of their variance, which may be attributed to stable personality traits and/or to a stable work environment (Headey & Wearing, 1989; Ormel & Schaufeli, 1991).

However, although the stability and change model with a reciprocal relationship (M3) also showed a good fit with the data (Table 4), detailed results revealed that the parameter estimates of the reciprocal regression paths were very small and non-significant. Thus, when the normal and reversed relationships were estimated simultaneously, they counteracted each other and became non-

TABLE 4
Goodness-of-fit statistics for stability and change models of job resources and work engagement

Stability and change models	χ^2	*df*	*p*	$\Delta\chi^2(\Delta df)$	*p*	*RMSEA*	*CFI*	*TLI*
Stability and change model of job resources	123.681	45	.000			.030	.986	.979
Stability and change model of work engagement	16.677	19	.612			.00	1.00	1.00
M0 (saturated structural model)	380.560	163	.000			.026	.987	.983
M1(normal causal model)	383.919	168	.000	M1 vs. M0 3.11 (5)	.68	.026	.987	.984
M2 (reversed causal model)	390.119	168	.000	M2 vs. M0 9.36 (5)	.10	.026	.987	.983
M3 (reciprocal causal model)	384.034	166	.000	M3 vs. M0 2.35 (3)	.50	.026	.987	.983

χ^2 = chi-square test; *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker–Lewis index.

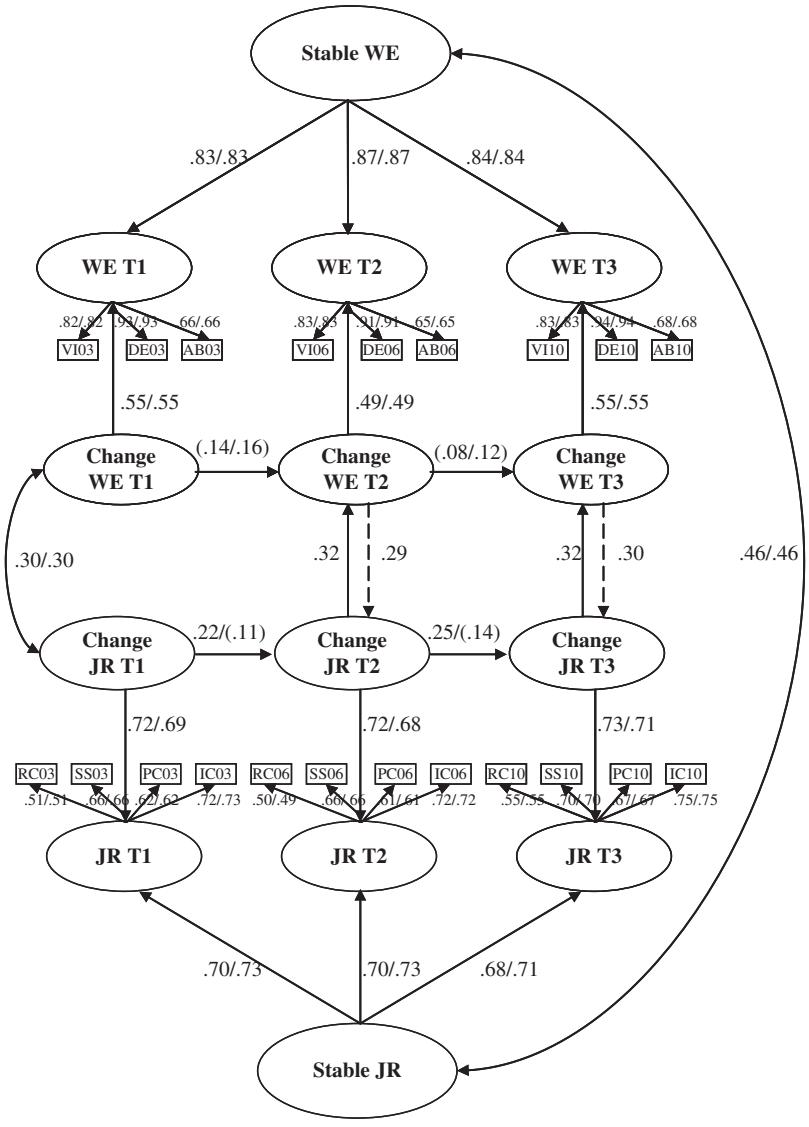

Figure 4. Stability and change model of job resources and work engagement (completely standardized solution). Coefficients on the left are for the model with normal relationship and on the right for the model with reversed relationship. Autocorrelations are omitted for reasons of clarity, and non-significant paths are in brackets. WE = Work Engagement; JR = Job Resources.

significant. This may be due to over-parameterization of the model, which means that the model is too complex (e.g., Kline, 2011). However, it may also be that the reciprocal effects are too small to become significant or that they do not exist at all. Thus, Hypothesis 2 was rejected.

Taken together, the model with a reciprocal relationship had to be rejected, the models with normal and reversed relationships provided an equally good fit with the data and the parameter estimates were almost equal in size. Therefore, after excluding the stable factors of job resources and work engagement, this study could not determine the primary direction of the relationship between the change factors. Although a positive relationship exists between job resources and work engagement, in either a normal or reversed direction, the relationship may not be reciprocal. The final results of the models with normal and reversed relationships are presented in Figure 4.

Job stayers versus job changers

Finally, the multi-group analyses revealed that the extent to which work engagement and job resources can be explained by the stable and change factors was similar, regardless of job change. The stable factor of job resources seemed to explain less variance among job changers (average 30%) than among job stayers (average 50%), but this difference was not statistically significant. Furthermore, the multi-group analyses showed that the relationship between work engagement and job resources was similar among job stayers and job changers. The fit and the parameter estimates of the models with normal and reversed relationships were almost identical.

However, the model with reciprocal regression paths could not be identified when estimated as a multi-group structural equation model. Therefore, Hypothesis 3 was partially supported; the stability of work engagement and job resources was similar for job stayers and job changers, but the assumed reciprocal relationship between work engagement and job resources was not supported.

DISCUSSION

In this study, we focused on the stability of work engagement and job resources, and the strength and direction of the relationship between them by utilizing the stability and change model, the JD-R model and the COR theory. Our study supported the theoretical assumptions of the stability and change model (Ormel & Schaufeli, 1991). However, after taking into account the stability of job resources and work engagement, less support was found for the theoretical assumptions of the JD-R model (Demerouti et al., 2001) and the COR theory (Hobfoll, 2001).

First, the study showed that as expected, work engagement appeared to be a highly stable state of mind and the stable component mainly explained the variance of work engagement. The stable component specifically accounted for 69–77% of the variance of dentists' work engagement, and thus the change components accounted for 23–31%. Thus far, only one study has utilized the stability and change model when investigating the stability of work engagement. Compared to that study, the stable component of work engagement in this study explained more of the variance (69–77% vs. 54–66%, see Brauchli et al., 2013). However, a few studies exist on other aspects of work-related well-being (i.e., job satisfaction and burnout; Dormann, Fay, Zapf, & Frese, 2006; Schaufeli et al., 2011) and context-free ill-being (i.e., psychological distress; Gorgievski-Duijvesteijn, Bakker, Schaufeli, & van der Heijden, 2005; Ormel & Schaufeli, 1991). In these studies, the stable component only explained about 25% of the variance of job satisfaction (Dormann et al., 2006) and about one-third of the variance of burnout (Schaufeli et al., 2011), whereas for psychological distress it explained almost two-thirds (Gorgievski-Duijvesteijn et al., 2005; Ormel & Schaufeli, 1991). Therefore, the stability of work engagement appears to be more comparable with the stability of context-free ill-being than with the stability of work-related well-being. It seems that work engagement among dentists is not so sensitive to occasional environmental influences; instead, the stable component of work engagement plays an important role in explaining current feelings of work engagement.

Furthermore, the stable component explained half of the variance in job resources. In more detail, the current study showed that the stable component explained 46–49% of the variance of dentists' job resources, and that the change components explained 51–54%. Therefore, in line with expectations, job resources had some stability, but were less stable than work engagement. Only one previous study has utilized the stability and change model to investigate the stability of job resources. The results of our study are comparable with those of this previous study, which showed that the stable component of job resources explained 49–69% of the total variance (Brauchli et al., 2013). It seems that job resources, as a job characteristic, may have a somewhat unique form of stability. In one previous study, the stable component did not have significant influence on the actual level of job demands (Schaufeli et al., 2011). Furthermore, it was found that between 14% and 18% of financial problems (i.e., resource loss) were explained by the stable component (Gorgievski-Duijvesteijn et al., 2005). Thus, the stable component seems to play a more significant role in job resources than in job demands and financial problems. One possible explanation is that job demands or resource losses have stronger and long-lasting impacts than positive job resources, reducing the influence of their stable level (see Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; see also Brauchli et al., 2013).

This study also showed that as expected, the stability of work engagement and job resources was similar for those dentists who stayed at the same workplace during the whole measurement period and for those who changed workplaces. Although previous studies have found that career transitions affect the stability of work engagement and job resources (De Lange et al., 2008; Mäkikangas et al., 2013), job change was not significant in this study. One likely explanation is that in line with the theoretical assumptions of the dynamic equilibrium model, the long, seven-year time lag of this study activated adaptation processes and restored the stable level of work engagement and job resources (Headey & Wearing, 1989; Ormel & Schaufeli, 1991). Although there are no results for work engagement yet, a previous study has found that it takes about two years to reach the normal equilibrium level of burnout after job change (Dunford, Shipp, Boss, Angermeier, & Boss, 2012). Furthermore, the dentists who had changed workplaces were still working in dentistry; thus, their work content and working conditions remained relatively the same.

Second, contrary to expectations, the hypothesis of the positive reciprocal relationship between job resources and work engagement was rejected. The parameter estimates of the reciprocal regression paths were very small and non-significant. Furthermore, both the model with a normal relationship and the model with a reversed relationship fit the data equally well and the parameter estimates were almost identical. Therefore, there was no statistical basis for favouring one model over another and neither job resources nor work engagement can be considered the primary initiator of the positive relationship between them. Job resources can have a positive

impact on dentists' work engagement, but this relationship can also be the other way around.

However, a closer look at the parameter estimates revealed that the longitudinal effects between the change factors of job resources (T1–T3) were somewhat different between the models with a normal relationship (M1) and a reversed relationship (M2; see Figure 4). Although not theoretically expected (Headey & Wearing, 1989; Ormel & Schaufeli, 1991), this could have been an indication of the cross-lagged effects between job resources and work engagement. Thus, we addressed this possibility. However, the cross-lagged effects were not significant in either direction. This result was, nevertheless, expected, as the seven-year time-lag enables the adaptive mechanisms to have time to offset any possible cross-lagged effects (Headey & Wearing, 1989; Ormel & Schaufeli, 1991).

Furthermore, the results of the multi-group analyses revealed that job change did not influence the direction of the relationship between job resources and work engagement, as was found in a previous study (De Lange et al., 2008). The considerably long time-lag of this study may explain the difference between these findings. As previously mentioned, the effects of job change may fade away after a longer time-period (e.g., Boswell, Shipp, Payne, & Culbertson, 2009; Dunford et al., 2012). Thus, we can speculate that the direction of the relationship between job resources and work engagement may have been different after a job change if they had been examined with a shorter follow-up period. Therefore, despite the job situation, after controlling for stability, there is a positive relationship between job resources and work engagement. However, the relationship may not be mutual and we cannot identify what causes what.

As a final remark, after excluding stability, the strength of the relationship between job resources and work engagement was rather weak. Around 10% of the change component of work engagement could be accounted for by job resources, and vice versa. The somewhat weak strength of the relationship underlines the importance of the previous suggestions that future studies on work engagement should consider context sensitivity and perhaps focus more on occupation-specific job resources (e.g., Hakanen & Roodt, 2010; Mauno et al., 2010; see also Hakanen, Perhoniemi, et al., 2008). Although from the generalizability perspective it is important to study job resources that are typical to most professions (as in the present study), these job resources might be relevant for work engagement in various degrees among different professional groups (e.g., Hakanen & Roodt, 2010).

Study strengths and limitations

The strengths of this study were the large, representative sample of Finnish dentists (n = 1,964), and a three-wave longitudinal study with a time period of seven years, which is thus far the longest follow-up study on work engagement. A further strength was that the study innovatively took into account the stability of job resources; this perspective has been largely neglected in previous studies. In addition, we tested the possible influence of job change and thus avoided misleading conclusions on the basis of career transitions.

Nevertheless, this study also has a few limitations that need to be acknowledged. First, as it concentrated on Finnish dentists only, we can question whether the results are generalizable beyond this particular professional group. However, previous longitudinal studies have suggested rather high stabilities for work engagement regardless of professional group. A further limitation could be that the results only refer to the dentists who participated in the study at all three time periods. Furthermore, as the dentists who took part at all study periods reported somewhat greater dedication, it is possible that the results are especially relevant for dentists with more dedication. However, it is noteworthy that the participants and the dropouts did not differ in relation to the two other dimensions of work engagement, i.e., vigour and absorption. In addition, the long time-lags (three and four years) of the current study made it difficult to investigate the dynamic processes. The longer the time-lag, the more likely it is that the adaptive mechanisms have time to be effective in returning levels of work engagement and perceptions of job resources to their characteristic level. Future studies could therefore include even more measurement points with smaller time lags, in order to investigate dynamic processes more closely.

Furthermore, the stable component of work engagement and job resources refers to stable personal characteristics as well as stable environmental factors, and it was not possible to determine the primary cause of the stability. The dentists' work content remained rather stable over the seven-year time period (see, e.g., Leana & Barry, 2000). Previous studies have also found relationships between certain personality traits (i.e., extraversion, conscientiousness and neuroticism/emotional stability) and work engagement (e.g., Inceoglu & Warr, 2011; Kim, Shin, & Swanger, 2009; Langelaan, Bakker, Van Doornen, & Schaufeli, 2006). In addition, personality-based resources (e.g., self-efficacy; Schwarzer & Jerusalem, 1995; see also Bandura, 1997) have been positively and reciprocally related to job resources over time (e.g., Llorens, Schaufeli, Bakker, & Salanova, 2007; Xanthopoulou et al., 2009) and they may also determine individuals' perceptions of working conditions (e.g., Judge, Bono, & Locke, 2000). Thus, including personality-based variables in future studies could clarify the basis of the time-invariant stability of work engagement, as well as that of job resources.

Finally, and related to the preceding limitation, this study utilized only self-reported measures. However, those job resources that have an intrinsic motivational role for a particular employee may be rather difficult, or even impossible, to measure objectively. In addition, on the basis of a thorough investigation on common method

problems by Podsakoff and colleagues (2003) and Spector (2006), it can be questioned whether the general arguments on common method biases are to some extent overstated. The longitudinal design also reduces the risks of common method bias. Nevertheless, future studies could benefit from further measures of job resources, for example bonuses, courses or other-rated measures.

Theoretical and practical implications and recommendations for future studies

From the theoretical perspective, this study showed that the idea of dynamic equilibrium applies to work engagement and job resources. Furthermore, the equilibrium level of these constructs remains the same, in spite of job change. After excluding the stable component, there was one-quarter to one-third of the variance left in work engagement, and about half of the variance in job resources, which can still be influenced. However, although there is a positive relationship between job resources and work engagement after excluding stability, this relationship may not be mutual, and both directions, normal and reversed, are as likely. So far, no studies have investigated whether the extent of the stability is similar for each dimension of work engagement. Therefore, future studies could clarify whether some of the dimensions of work engagement are more susceptible to change (see Hätinen, Mäkikangas, Kinnunen, & Pekkonen, 2013) and whether the direction of the relationships between job resources and sub-dimensions are different.

Practically, because of the great extent of the stable variance inherent in work engagement, and also the moderate extent of the stable variance inherent in job resources, it may be rather difficult to increase them (Headey & Wearing, 1989). This is a crucial concern for organizational interventions—how to prevent work engagement returning to the original level? According to this study, in order to cause deviations from the habitual level of work engagement, the interventions need to be either considerable one-time effects, or minor but continuous and long-standing, and preferably part of everyday practices at the workplace. Furthermore, as the stability of work engagement seems to be a function of work content (e.g., job resources) and individual aspects (e.g., personality), interventions and job redesign practices could perhaps in the future involve the self (e.g., individual resources) as well as the work, in order to effectively influence work engagement (see Vuori, Toppinen-Tanner, & Mutanen, 2012).

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