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Don't leave your heart at home
Gain cycles of positive emotions, resources, and engagement at work

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Abstract

Purpose – The main objective of this study is to apply broaden-and-build theory to occupational wellbeing. More specifically, it seeks to test whether positive emotions "build" resources and to what extent they contribute to work engagement through an increase in personal or job resources. Additionally, it aims to hypothesize that positive emotions, resources, and work engagement are reciprocally related to each other in a way akin to a gain cycle.

Design/methodology/approach – In order to test whether positive emotions, personal and job resources, and work engagement are related over time, a structural equation model was constructed. The model was based on two waves of data, with a time lag of six months.

Findings – Results show a reciprocal relationship between positive emotions and personal resources. Furthermore, there is a causal effect of personal resources on work engagement and a reversed causal effect of work engagement on positive emotions. Most surprising is the fact that no relationships with job resources are found to be significant.

Research limitations/implications – Because the authors exclusively used self-report measures to assess positive emotions, resources, and work engagement, the cross-paths might have been inflated.

Practical implications – The results underline the importance of increasing both positive emotions and the level of personal resources in order to create an engaged workforce.

Originality/value – The study adds to the existing literature in the sense that the research model entailed positive emotions as a "novel" variable in the context of resources and work engagement. The model recognized the building capacity of positive emotions as well as the potential of personal resources in predicting work engagement.

Keywords Positive emotions, Personal resources, Job resources, Work engagement, Gain cycles, Broaden-and-build theory, Quality of life, Workplace

Paper type Research paper

When people go to work, they shouldn't have to leave their hearts at home (Betty Bender).

Introduction

According to Ulrich (1997, p. 125), a leading HRM-scholar, "employee contribution becomes a critical business issue because in trying to produce more output with less

employee input, companies have no choice but to try to engage not only the body, but also the mind and the soul of every employee". So, organizations are in need of employees who are willing to psychologically invest in their work, i.e. who are engaged. Work engagement is an active type of wellbeing (Warr, 1990), which is defined as "a positive, fulfilling, and work-related state of mind that is characterized by vigor, dedication and absorption" (Schaufeli and Bakker, 2004, p. 295). Vigorous employees experience high levels of energy at work and motivation to invest effort into work. They are dedicated by being strongly involved into work and experiencing feelings of pride and enthusiasm about their work. Finally, absorption entails immersion in and concentration on work, as well as the feeling that time is flying at work. Obviously, the work environment, in terms of resources and demands, plays an important role in determining how engaged employees feel at work. Using the Job Demands-Resources (JD-R) model (Demerouti *et al.*, 2001) as a theoretical framework, several studies have confirmed this, not only cross-sectionally but also over time (see for a review Halbesleben, 2010). However, employees' engagement at work is also dependent on their individual characteristics (Bakker and Demerouti, 2008; Judge and Bono, 2001; Xanthopoulou *et al.*, 2007). More recently the role of individual antecedents, also termed personal resources, in predicting work engagement is investigated as well (e.g. Xanthopoulou *et al.*, 2009; Weigl *et al.*, 2010). Broaden-and-Build (B&B) theory (Fredrickson, 1998, 2001) states that the experience of positive emotions can build resources and may predict wellbeing in the long run. Taking B&B theory as a starting point, it would be interesting to investigate what role positive emotions play in the process of initiating the build of resources within a work-related context and predicting work engagement among employees.

The present study is aimed at investigating the predictive value of positive emotions, personal resources, and job resources for work engagement over time. Our research is innovative because we focus on positive emotions as a "novel" variable in the context of resources and engagement. Although positive emotions have been studied before as predictors of resources (e.g. Fredrickson *et al.*, 2008) or as predictors of engagement (e.g. Salanova *et al.*, 2011), so far they have not been combined with personal resources, job resources, and work engagement into one conceptual model. By combining these four constructs, our research model integrates B&B theory with the motivational process of the JD-R model. More specifically, our study applies B&B theory to occupational wellbeing in that our study tests one of the B&B assumptions, namely that positive emotions "build" resources which lead to a more active work attitude, i.e. work engagement. That is, we examine whether positive emotions contribute to work engagement through an increase in personal or job resources.

Building resources
Work-related positive emotions are described as relatively intense, short-lived affective experiences that are focused on specific objects or situations at work (Gray and Watson, 2001). Whereas positive emotions are immediate responses to the work environment, work engagement is relatively more enduring in nature (Schaufeli *et al.*, 2002). Therefore, it is plausible to assume that short-term positive emotions precede work engagement (Schaufeli and Van Rhenen, 2006). B&B theory posits that positive emotions not only make people feel good at a particular point in time, but these emotions may also predict future wellbeing (Fredrickson and Joiner, 2002). That is,

positive emotions produce wellbeing. According to B&B theory, positive emotions broaden thought-action repertoires by inducing exploratory behaviors that create learning opportunities and goal achievement, and help to build enduring resources. Thus, by experiencing positive emotions, people enhance their resources, which, in turn, may lead to a more enduring positive state of wellbeing, for instance, work engagement. The current study focuses specifically on these assumed relationships that are part of the "build hypothesis". Fredrickson *et al.* (2008) previously confirmed this hypothesis in a study in which they evaluated the effect of a loving-kindness intervention, using mindfulness meditation. Results showed that the intervention caused an increase in daily experiences of positive emotions over time, which, in turn, built personal resources such as social support and hope. Successively, these increased resources predicted enhanced life satisfaction. In a similar vein, positive emotions were found to predict resources such as resilience (Cohn *et al.*, 2009; Tugade and Fredrickson, 2007), optimism (Fredrickson *et al.*, 2003), and creativity in problem solving (Estrada *et al.*, 1994). Moreover, positive emotions were also found to be related to engagement in previous research, both directly (Avey *et al.*, 2008; Salanova *et al.*, 2011) and indirectly via personal resources (Ouweneel *et al.*, 2011).

In line with these results, we assume that positive emotions are not only directly related to work engagement, but also build personal resources. Personal resources are characteristics of the individual that are valued by the employee and could serve as a means to attain other positive personal characteristics, objects, energies or work conditions (Xanthopoulou *et al.*, 2007). As such, personal resources are functional in achieving goals, and stimulate personal growth and development (Xanthopoulou *et al.*, 2009). Next, it is likely to assume that an employee's emotional state positively influences the amount of job resources that are provided at work. Job resources refer to those physical, psychological, social, or organizational aspects of the job that are valued as such by the employee. Presumably, positive emotions have motivational properties in that they energize employees to seek social support and learn new things at work, and as such, increase job resource availability (e.g. Kanfer and Ackerman, 1989). Tellingly, employees set higher goals when they experience positive emotions, and thus create the necessary job resources to achieve those goals (Ilies and Judge, 2005). All in all, Hypothesis 1a poses that positive emotions at Time 1 (T1) directly relate to work engagement at Time 2 (T2). Moreover, we assume that positive emotions build resources as well. More specifically, we hypothesize that T1 positive emotions lead to both T2 personal resources and T2 job resources (Hypothesis 1b).

Resources facilitate work engagement
Next to the direct relationship between positive emotions and personal and job resources as well as work engagement, we also assume direct relationships between personal and job resources on the one hand, and work engagement on the other hand. As previously stated, B&B theory posits that resources ultimately lead to a state of wellbeing. Resources are likely to accumulate, thus creating a positive gain cycle of resources, which, in turn, is likely to have positive mental health-promoting effects (Hobfoll, 2002). In addition, the JD-R model entails the assumption that resources lead to work engagement (Schaufeli and Bakker, 2004). In other words, the JD-R model states that the presence of job resources predicts work engagement among employees through a motivational process (e.g. Hakanen *et al.*, 2006; Schaufeli and Bakker, 2004;

Schaufeli *et al.*, 2009). In more detail, job resources are assumed to play either an intrinsic motivational role because they foster employees' growth, learning and development, or an extrinsic motivational role because they are instrumental in achieving work goals (Schaufeli and Bakker, 2004).

Job resources can be considered intrinsic motivators in the sense that they fulfill basic human needs, such as the needs to belong, need for autonomy, and need for competence (Ryan and Frederick, 1997; Van den Broeck *et al.*, 2008). In this study, supervisory coaching, autonomy, and opportunities for development are studied as job resources. Supervisory coaching and autonomy satisfy the need to belong and the need for autonomy, respectively, whereas opportunities for development promote learning, thereby increasing job competence. Moreover, as said, job resources may also play an extrinsic motivational role, because resourceful work environments foster the willingness to dedicate one's efforts and abilities to the work task (Meijman and Mulder, 1998). In such environments, it is likely that the task will be completed successfully and that the work goal will be attained. For instance, supervisory coaching and autonomy increase the likelihood of being successful in achieving one's work goals. In any case, either through the satisfaction of employees' basic needs or through the achievement of work-related goals, job resources seem to have positive consequences and are likely to result in work engagement (Schaufeli *et al.*, 2009).

Consistent with these notions about the motivational role of job resources, several studies have shown a positive relationship between job resources and work engagement. For example, cross-sectional studies indicate that job resources such as supervisory coaching, autonomy, and opportunities for development relate positively to work engagement (Hakanen *et al.*, 2006; Saks, 2006; Xanthopoulou *et al.*, 2007). In addition, it was found among Finnish teachers that job resources predict work engagement, particularly when they were faced with high job demands (Bakker *et al.*, 2007). Moreover, in another Finnish sample of health care professionals, it was observed that autonomy leads to work engagement over time (Mauno *et al.*, 2007). Finally, positive longitudinal effects on work engagement have been found for supervisory coaching, autonomy, and opportunities for development (e.g. Xanthopoulou *et al.*, 2009; Weigl *et al.*, 2010).

Research on the effects of personal characteristics on wellbeing has shown that people's core self-evaluations (e.g. self-esteem, self-efficacy) positively influence wellbeing (Judge *et al.*, 2005; Judge *et al.*, 2004). More recently, a work-related set of personal characteristics has emerged as research topic in organizational psychology, namely Psychological Capital (PsyCap). PsyCap refers to a positive psychological state of development of an individual that is characterized by having confidence, making a positive contribution, persevering towards work-related goals and bouncing back from set backs at work (Luthans and Youssef, 2007). The present study focuses on three elements of PsyCap:

(1) hope;

(2) optimism; and

(3) self-efficacy.

The beneficial effects on wellbeing of these personal resources have been demonstrated in previous research among employees (e.g. Avey *et al.*, 2010; Gallagher and Lopez, 2009). Also, some research has provided evidence that suggests a positive relationship

between personal resources and work engagement specifically (see Salanova *et al.*, 2010, for an overview).

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Hope is the motivated persistent pursuit of goals and proactive determination of pathways to the goals; work-related hope is the perception that work-related goals can be set as well as achieved (Snyder *et al.*, 1996). In other words, hope, or positive expectancy, enables a person to direct energy in dedicatedly pursuing a goal, i.e. in being engaged (Gallagher and Lopez, 2009). Thus, when employees believe to be able to set goals and achieve them they would feel more enthusiastic and energetic at work (Sweetman and Luthans, 2010).

Similarly, optimism, which is the tendency to believe that one will generally experience good outcomes in life, is related to higher levels of wellbeing (Scheier *et al.*, 2001). Optimists are better able to confront threatening situations because they adopt active coping strategies (Iwanaga *et al.*, 2004), and as a result they adapt well at work (Luthans and Youssef, 2007), and feel more engaged at work (e.g. Xanthopoulou *et al.*, 2009).

Finally, efficacy beliefs are defined as "one's conviction (or confidence) about ones' abilities to mobilize motivation, cognitive resources or courses of action needed to successfully execute a specific task within a specific context" (Stajkovic and Luthans, 1998, p. 66). Self-efficacy beliefs contribute to motivation by influencing the effort individuals spend, and their perseverance when facing obstacles, problems, or unexpected situations (Bandura, 1997). Self-efficacious employees have been found to experience higher levels of flow (Salanova *et al.*, 2006) as well as higher levels of work engagement (e.g. Llorens *et al.*, 2007). We expect that work-related self-efficacy is positively related to work engagement because it leads to a greater willingness to spend additional energy and effort on completing a task, and hence to more task involvement and absorption (Schaufeli and Salanova, 2007). In conclusion, based on theorizing and previous empirical findings, we assume that experiencing a combination of self-efficacy, hope, and optimism predicts work engagement over time. Therefore, *Hypothesis 1c* states that both T1 personal resources and T1 job resources are related to T2 work engagement.

Reciprocal relationships
Although B&B theory and the motivational process of the JD-R model posit a specific sequence of variables, namely that positive emotions predict resources, which, in their turn, lead to work engagement, some empirical studies revealed reversed relationships. For example, in a longitudinal week-level study, Sonnentag *et al.* (2008) found that engaged employees are more likely to experience positive emotions at work. So, according to this study, work engagement precedes rather than results from positive emotions. A two-wave longitudinal study of Xanthopoulou *et al.* (2009) revealed that work engagement was related to both personal and job resources over time. Consequently, it seems somewhat simplistic to propose exclusively one-directional relationships between positive emotions, resources, and work engagement, and not to take reversed causation into account. In fact, recent studies successfully incorporated both causal as well as reversed causal – thus reciprocal – relationships between positive emotions and personal and job resources and wellbeing into one model. A set of constructs that are positively and reciprocally related to each other over time is also referred to as a "gain cycle" (see Salanova *et al.*, 2011 for an overview). For example,

Xanthopoulou *et al.* (2009) found a gain cycle of job resources (supervisory coaching, autonomy, and opportunities for development) and personal resources (organization-based self-esteem, optimism, and self-efficacy) with work engagement with a time lag of two years. Weigl *et al.* (2010) found similar results in a three-wave study among German hospital physicians with job control and work relationships as job resources, and active coping as a personal resource, and work engagement as a measure of wellbeing. More specifically, in their study, Weigl *et al.* (2010) found that resources led to work engagement over time, which, in its turn, led to more resources. Moreover, positive emotions, self-efficacy and activity engagement appeared to be reciprocally related among Spanish secondary school teachers (Salanova *et al.*, 2011), and it seems that self-efficacy may precede, as well as follow, engagement (Llorens *et al.*, 2007). This last finding suggests the existence of a gain cycle in which self-efficacy and engagement are positively related to each other. Hakanen *et al.* (2008) studied a sample of Finnish dentists and found a gain cycle of job resources, engagement, personal initiative, and innovativeness. Hence, all studies mentioned above, support the notion of a motivational gain cycle in which employees experience positive emotions and job or personal resources, and in turn, feel engaged in their work, and vice versa. Therefore, *Hypothesis 2* states that all study variables – positive emotions, personal resources, job resources, and work engagement – are reciprocally related over time. More specifically, work engagement is not only predicted by positive emotions and resources, but also the reversed relationships are assumed to occur. Moreover, personal and job resources are assumed to be reciprocally related to positive emotions as well as to each other.

Method
Participants
The study sample consists of 200 employees of a Dutch university. They were invited via e-mail to voluntary participate in a questionnaire study. On T1, 341 participants filled out the questionnaire, with a response rate of 46 percent. On T2, six months later, 200 employees completed the same questionnaire (59 percent). Of this panel sample, 64.5 percent was female and participants' age ranged from 23 to 66 years ($M = 39.00$; $SD = 12.04$). Most of the participants were either living together or were married (70.5 percent). On average, participants worked a little over nine years at university. Of the panel sample, 25.1 percent of the participants had an administrative job, 24.1 percent were PhD candidates, 21.1 percent were assistant professors, 9.5 percent were junior teachers, and 20.2 percent had other scientific jobs.

In order to test whether dropout was selective, we compared the dropouts ($n = 141$) with the panel group ($n = 200$). The results of Multivariate Analyzes of Variance showed that the dropouts did not significantly differ from the panel group members, neither with regard to demographics (age, gender, marital status, years of working experience at university, and type of job) ($F(5, 322) = 1.72$, $p = 0.13$) nor the T1 study variables ($F(8, 332) = 1.29$, $p = 0.24$). So, dropout appeared not to be selective.

Measures
Positive emotions. The experience of positive emotions was assessed using the six positive items of the Job-related Affective Wellbeing Scale (JAWS; Van Katwyk *et al.*, 2000; translated into Dutch and shortened by Schaufeli and Van Rhenen, 2006). A

sample item is "During my work, I feel relaxed". The participants answered using a five-point Likert scale (1 = (almost) never, 5 = (almost) always).

Personal resources. Three types of personal resources were assessed:

(1) hope was measured using a six-item scale (work-adjusted version of State Hope Scale (SHS); Snyder *et al.*, 1996), of which a sample item is: "I can think of many ways to reach my current work-related goals";

(2) optimism was measured using a six-item scale by Luthans *et al.* (2007) (work-adjusted and shortened version of the Life Orientation Test (LOT); Scheier and Carver, 1985), of which an example item is: "With respect to my work, I always look on the bright side"; and

(3) self-efficacy was assessed with a five-item scale that was constructed following Bandura's (2012) recommendations so that it could be applied to an occupational setting. A sample item is: "I can always manage to solve difficult problems at work if I try hard enough".

All personal resources items were scored on a six-point Likert scale (1 = strongly disagree, 6 = strongly agree).

Job resources. Three types of resources were assessed:

(1) supervisory coaching was measured using five items from the Dutch adaptation (Le Blanc, 1994) of the Leader-Member Exchange scale (LMX; Graen and Uhl-Bien's, 1991), of which a sample item is: "My supervisor uses his/her influence to help me solve my problems at work";

(2) autonomy was measured using a three-item scale (deducted from the Dutch Questionnaire on Experience and Evaluation of Work (VBBA); Van Veldhoven and Meijman, 1994), of which an example item is: "Do you have control over how your work is carried out?"; and

(3) opportunities for development were assessed using four-item scale of the Job Content Instrument (JCI; Karasek, 1985), of which an example item is: "My job offers me the opportunity to learn new things".

All job resources items were scored on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Work engagement. We used the short version of the Utrecht Work Engagement Scale (UWES; Schaufeli *et al.*, 2006) to measure work engagement. The scale consists of nine items. A sample item is "At my work, I feel bursting with energy". All items were scored on a seven-point Likert scale (0 = never, 6 = always).

Data analyses

Means, standard deviations, Cronbach's alpha coefficients, and bivariate correlations were computed for every study variable on both T1 and T2. Next, measurement models including all scales were tested on T1 data by means of Confirmatory Factor Analysis (CFA) as implemented by the AMOS software program (Arbuckle, 2005). We tested five separate factor models:

(1) a one-factor measurement model which hypothesized that all four constructs loaded on a single latent factor;

(2) a two factor model in which all four constructs were separated into two factors, namely wellbeing (positive emotions and work engagement), and resources (personal resources and job resources);

(3) a three factor model with a wellbeing factor (positive emotions and work engagement), a factor of personal resources, and a factor of job resources;

(4) another three factor model, with positive emotions as a separate factor, resources (personal resources and job resources) as a combined factor, and work engagement as a separate factor; and

(5) a four factor model in which all four constructs were incorporated as four separate factors, namely positive emotions, personal resources, job resources, and work engagement.

The factor models with multiple factors ((2)-(5)) were oblique models in which the factors were assumed to be interrelated.

Finally, Structural Equation Modeling (SEM) by the AMOS program was used to establish the relationships over time between the study variables. Four models were tested.

First, we tested the Stability Model (Model 1; M1) with temporal stabilities and synchronous correlations, without cross-lagged structural paths. Temporal stabilities were specified as autoregressive paths between the corresponding constructs at T1 and T2. Model 1 estimates the total stability coefficient between T1 and T2 without specifying the variance in paths between the research variables (Pitts *et al.*, 1996). Second, we compared the fit of the stability model to that of three more complex models:

(1) the causality model (Model; M2), which is identical to Model 1 but includes six additional cross-lagged structural paths from T1 positive emotions to T2 personal resources, to T2 job resources, and to T2 work engagement, from T1 personal resources to T2 job resources, and to T2 work engagement, as well as from T1 job resources to T2 work engagement;

(2) the reversed causality model (Model 3; M3), which is also identical to M1, but includes six additional cross-lagged structural paths from T1 work engagement to T2 job resources, to T2 personal resources, and to T2 positive emotions, from T1 job resources to T2 personal resources, and to T2 positive emotions, as well as from T1 personal resources to T2 positive emotions; and

(3) the reciprocal model (Model 4; M4), which includes 12 reciprocal relationships between positive emotions, personal resources, job resources, and work engagement and thus includes all cross-lagged structural paths of M2 and M3.

In all four models, the measurement errors of the corresponding observed variables collected at the two time points were allowed to co-vary over time (e.g. a covariance is specified between the measurement error of hope at T1 and the measurement error of hope at T2). While in cross-sectional models measurement errors should not co-vary, in longitudinal measurement models the measurement errors corresponding to the same indicator should be allowed to co-vary over time in order to account for the systematic (method) variance that is associated with each specific indicator (Pitts *et al.*, 1996; McArdle and Bell, 2000). Because of our relatively small sample size, we decreased the

complexity of our hypothesized SEM by using manifest variables where possible (Jöreskog and Sörbom, 1993). More specifically, variables consisting of one validated scale were inserted in the model as manifest variables (positive emotions and work engagement); variables consisting of multiple and separate validated scales were inserted in the model as latent factors with observed indicators (personal resources and job resources). This was done to keep the model as simple as possible.

We used maximum likelihood estimation methods with the covariance matrix of the items as input for each analysis. We assessed goodness-of-fit of the models by using absolute and relative indices. The absolute goodness-of-fit indices calculated were the χ^2 Goodness-of-Fit Statistic, Goodness-of-Fit Index (GFI), and the Root Mean Square Error of Approximation (RMSEA). Because χ^2 is sensitive to sample size, the computation of relative goodness-of-fit indices is strongly recommended (Bentler, 1990). We computed three of such relative fit indices:

(1) the Tucker-Lewis Index (TLI);

(2) the Comparative Fit Index (CFI); and

(3) the Incremental Fit Index (IFI).

Values smaller than 0.08 for the RMSEA are indicative of a good fit, and values greater than 0.10 should lead to model rejection (Browne and Cudeck, 1993). For all other fit indices, i.e. GFI, TLI, CFI, and IFI, values greater than 0.90 indicate an acceptable fit, and values greater than 0.95 are considered as indicating a good fit (Hu and Bentler, 1999).

Results

Preliminary analyses

Means, standard deviations of the study variables of T1 and T2, Cronbach's alpha coefficients and bivariate correlations of all variables are reported in Table I. All alpha coefficients met the criterion of 0.70 (Nunnally and Bernstein, 1994), except for T2 autonomy ($\alpha = 0.66$). Furthermore, Table I shows that, in line with our expectations, positive emotions, personal resources (hope, optimism, and self-efficacy), job resources (supervisory coaching, autonomy, and opportunities for development), and work engagement are positively related to each other within time at both T1 and T2. Moreover, with three exceptions (between T1 opportunities for development and T2 self-efficacy; $r = 0.08$, between T1 supervisory coaching and T2 self-efficacy; $r = 0.13$, and between T1 supervisory coaching and T2 hope; $r = 0.11$), all across-time correlations were positive and significant as well.

To start, we checked our data for normality (see Muthén and Kaplan, 1985). The assumption of normality was not violated. The results of the analyses can be obtained from the first author upon request. We conducted CFA's on T1 data to distinguish amongst the constructs of positive emotions, personal resources, job resources, and work engagement. Results showed that the one-factor, two-factor model, and the two three-factor models, which are described in the method section, could not account sufficiently for the variance in the model; the four-factor model, with positive emotions, personal resources, job resources, and work engagement as separate factors, fitted the data significantly better than all other factor models. Even though the Chi-square value of the four-factor model was significant (χ^2 (48) = 143.75, $p < 0.001$), the relative fit indices were all meeting the criteria for an acceptable fit, except for the GFI

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Positive emotions T1	3.60	0.63	(0.85)															
2. Positive emotions T2	3.51	0.63	0.68	(0.83)														
3. Hope T1	4.53	0.69	0.61	0.55	(0.88)													
4. Hope T2	4.51	0.60	0.38	0.51	0.54	(0.83)												
5. Optimism T1	4.29	0.71	0.62	0.54	0.66	0.38	(0.74)											
6. Optimism T2	4.27	0.66	0.50	0.59	0.45	0.50	0.61	(0.71)										
7. Self-efficacy T1	4.36	0.69	0.47	0.42	0.73	0.42	0.65	0.42	(0.88)									
8. Self-efficacy T2	4.40	0.71	0.33	0.43	0.44	0.61	0.42	0.55	0.56	(0.89)								
9. Supervisory coaching T1	3.67	0.91	0.33	0.32	0.34	0.11^{ns}	0.35	0.21^{**}	0.23	0.13^{ns}	(0.93)							
10. Supervisory coaching T2	3.55	0.93	0.31	0.36	0.34	0.24	0.34	0.33^{**}	0.21^{**}	0.15^{*}	0.79	(0.93)						
11. Autonomy T1	4.18	0.62	0.29^{**}	0.26	0.33	0.22	0.31	0.22^{**}	0.30	0.22^{**}	0.22^{*}	0.28	(0.74)					
12. Autonomy T2	4.12	0.55	0.21^{**}	0.29	0.32	0.26	0.22^{**}	0.16^{*}	0.21^{**}	0.16^{*}	0.19^{**}	0.28	0.59	(0.66)				
13. Opportunities for development T1	3.49	0.89	0.47	0.36	0.38	0.18^{*}	0.16^{*}	0.27	0.25	0.08^{ns}	0.40	0.41	0.47	0.40	(0.87)			
14. Opportunities for development T2	3.35	0.82	0.42	0.42	0.35	0.33	0.27	0.38	0.23	0.16^{*}	0.32	0.45	0.46	0.47	0.77	(0.85)		
15. Work engagement T1	3.64	1.11	0.74	0.62	0.56	0.39	0.38	0.41	0.42	0.25	0.30	0.33	0.35	0.27	0.59	0.54	(0.93)	
16. Work engagement T2	3.52	1.04	0.61	0.72	0.53	0.52	0.41	0.048	0.39	0.36	0.27	0.36	0.35	0.35	0.46	0.56	0.82	(0.92)

Notes: M = Mean; Sd = Standard deviation; ns = Non significant, $^{*}p < 0.05$, $^{**}p < 0.01$, all other correlations are significant at $p < 0.001$

Table I.
Means, standard deviations, correlations, and Cronbach's alpha coefficients (on the diagonal) of the research variables on T1 and T2

(RMSEA = 0.10; GFI = 0.89; TLI = 0.91; CFI = 0.94; IFI = 0.94). Taken together, these results, which are presented in Table II, suggest that positive emotions, personal resources, job resources, and work engagement are interrelated, yet distinct constructs.

Model test
Table III shows the fit indices of the four competing models. As can be seen, the causality model (M2) fitted the data better than the stability model, although the difference was not significant (M1) ($\Delta \chi^2$ (6) = 9.87, p = ns). Furthermore, the fit of the reversed causality model (M3) is superior to that of the stability model (M1) ($\Delta \chi^2$ (6) = 19.37, $p < 0.01$). This suggests that the model with cross-lagged reversed causal paths from T1 to T2 variables (i.e. M3), has a better fit to the data than the model including solely temporal stabilities and synchronous correlations (i.e. M1). Finally, Table III shows that the reciprocal model (M4) fits the data better than M1, M2, and M3. This indicates that the model that includes reciprocal relationships among positive

Model	χ^2	df	RMSEA	GFI	TLI	CFI	IFI	$\Delta \chi^2$	Δ df
1: One factor model	374.28[*]	54	0.17	0.73	0.74	0.79	0.79		
2: Two factor model	282.54[*]	53	0.15	0.79	0.81	0.85	0.85	M2 – M1 = 91.74[*]	1
3A: Three factor model	222.00[*]	51	0.13	0.83	0.85	0.89	0.89	M3A – M1 = 152.28[*]	3
3B: Three factor model	215.73[*]	51	0.13	0.85	0.86	0.89	0.89	M3B – M1 = 158.55[*]	3
4: Four factor model	143.75[*]	48	0.10	0.89	0.91	0.94	0.94	M4 – M1 = 230.53[*]	6
								M4 – M2 = 138.79[*]	5
								M4 – M3A = 76.25[*]	3
								M4 – M3B = 71.98[*]	3

Notes: χ^2 = Chi-square statistic; df = Degrees of freedom; RMSEA = Root mean square error of approximation; GFI = Goodness-of-Fit Index; TLI = Tucker-Lewis Index; CFI = Comparitive Fit Index; IFI = Incremental Fit Index; [*]$p < 0.001$. Two factor model: wellbeing (positive emotions and work engagement), and resources (personal resources and job resources); Three factor model (A): wellbeing (positive emotions and work engagement), personal resources, and job resources; Three factor model (B): positive emotions, resources (personal resources and job resources), and work engagement; Four factor model: positive emotions, personal resources, job resources, and work engagement

Model	χ^2	df	RMSEA	GFI	TLI	CFI	IFI	$\Delta \chi^2$	Δ df
M1: Stability model	139.47[***]	86	0.06	0.92	0.96	0.97	0.98		
M2: Causality model	129.60[***]	80	0.06	0.93	0.96	0.98	0.98	M2 – M1 = 9.87	6
M3: Reversed causality model	117.10[**]	80	0.05	0.93	0.97	0.98	0.98	M3 – M1 = 19.37[**]	6
M4: Reciprocal model	108.41[**]	74	0.05	0.94	0.97	0.98	0.98	M4 – M1 = 31.06[**]	12
								M4 – M2 = 21.19[**]	6
								M4 – M3 = 8.69	6
M5: final model	111.76[*]	82	0.04	0.94	0.98	0.99	0.99	M5 – M4 = 3.35	12

Note: χ^2 = Chi-square statistic; df = Degrees of freedom; RMSEA = Root Mean Square Error of Approximation; GFI = Goodness-of-Fit Index; TLI = Tucker-Lewis Index; CFI = Comparitive Fit Index; IFI = Incremental Fit Index; [*]$p < 0.05$; [**]$p < 0.01$; [***]$p < 0.001$

emotions, personal resources, job resources and work engagement, is superior to all other alternative models. All hypotheses are interpreted on the basis of the final model (M5), which is displayed in Figure 1. The model contains the reciprocal relationships of M4 except for the non-significant paths of M4.

H1a states that T1 positive emotions are directly related to T2 work engagement. *H1b* states that T1 positive emotions are related to T2 personal resources and T2 job resources. *H1c* states that T1 personal resources and T1 job resources are related to T2 work engagement. Of these five hypothesized relationships, two turned out to be partly confirmed. The standardized effect of T1 positive emotions on T2 personal resources ($\beta = 0.17$) and of T1 personal resources on T2 work engagement ($\beta = 0.11$) appeared to be significant. However, the lagged effects of T1 positive emotions on T2 job resources and on T2 work engagement, and of T1 job resources on T2 work engagement were not significant at $p < 0.05$. Thus, *H1a* is rejected and *H1b* and *H1c* are partly confirmed.

According to *H2*, all study variables (positive emotions, personal resources, job resources, and work engagement) are reciprocally related over time. We found significant reciprocal relationships only between positive emotions and personal resources ($\beta = 0.17$ and $\beta = 0.22$ respectively). However, no significant reciprocal relationships were found between positive emotions and work engagement (only reversed causal: $\beta = 0.17$), or between personal resources and work engagement (only causal: $\beta = 0.11$). Neither did we find a reciprocal relationship between positive emotions and job resources and between job resources and work engagement. Based on these results, *H2* is partly confirmed. Hence, our results show that both causal and reversed causal relationships exist simultaneously, which is confirmed by the good model fit of M5 (RMSEA = 0.04; GFI = 0.94; TLI = 0.98; CFI = 0.99; IFI = 0.99). Finally, the explained variance of M5 in T2 positive emotions was 53 percent. For T2 personal resources, the explained variance was 49 percent. For T2 job resources, the explained variance was 79 percent. Finally, the explained variance in T2 work engagement was 67 percent.
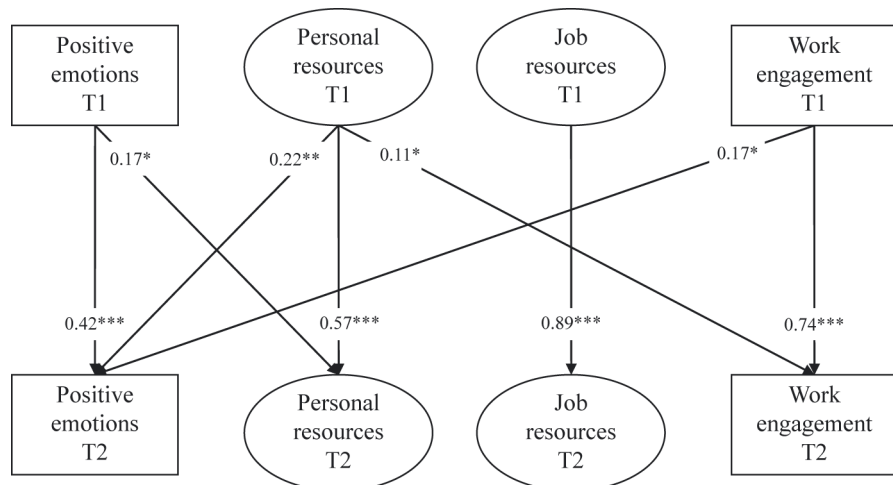

Figure 1.
Final model (M5)

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Discussion

The main objective of our study was to examine longitudinal relationships between positive emotions, personal and job resources, and work engagement over two waves. It was hypothesized that the variables were reciprocally related over time in a way that is compatible with the notion of a gain cycle. Indeed, compared to alternative models, it appeared that the reciprocal model represented the data best. Accordingly, the relationships between positive emotions, personal resources, job resources, and work engagement are best interpreted when all effects are taken into account simultaneously. However, it was demonstrated that only part of the study variables are reciprocally related over time (*H2*). We found a reciprocal relationship between positive emotions and personal resources. Furthermore, we found a causal effect of personal resources on work engagement and a reversed causal effect of work engagement on positive emotions. Most surprising was the fact that we did not find any relationships with job resources to be significant.

Based on our results we state that, to some extent, positive emotions, personal resources, and work engagement are related to each other in a way akin to a gain cycle, in which no specific causal sequence occurs. Instead, positive emotions, personal resources, and work engagement constitute a loop. These results partly confirm B&B theory, in that employees who experience positive emotions at a certain point in time are more like to experience personal resources at a later time point. So, whilst employees experience positive emotions at work, they are prone to feel more hopeful, optimistic and self-efficacious. In conclusion, employees who experience positive emotions are likely to feel more positive about their work-related abilities. In another study among students, similar results were found: positive emotions led to study-related hope, optimism, and self-efficacy over time (Ouweneel *et al.*, 2011).

Personal resources appeared to have a significant effect on work engagement over time. In line with B&B theory, we confirmed that personal resources lead to wellbeing, i.e. work engagement, over time. Previous studies confirmed this relationship as well (e.g. Hakanen *et al.*, 2008; Weigl *et al.*, 2010; Xanthopoulou *et al.*, 2009). More specifically, personal resources represent the positive cognitive evaluations of one's future in work (i.e. hope and optimism) and of oneself as an employee (i.e. self-efficacy), which influence how engaged employees are. Either way, it has been stated that personal resources should not only function as a "mean" for job success, but should also considered to be an "end" in the sense that personal resources support adaptation to and coping with the work environment by employees and as such help employees to have successful careers (Bakker and Demerouti, 2007; Gorgievsky and Hobfoll, 2008).

In our study, work engagement was not related to future personal or job resources. Apparently, work engagement has limited "building capacities" despite its positive affective component. Researchers have proposed that engagement stands at the beginning of the building process (e.g. Salanova *et al.*, 2010; Xanthopoulou *et al.*, 2009). However, our results do not confirm such an assumption; rather, work engagement acts as an outcome measure in the current model. Nevertheless, work engagement appeared to have a significant relationship with positive emotions over time. In other words, the outcome of the building process, work engagement, has a positive relationship with the initiators of the building process, i.e. positive emotions, thereby closing the gain cycle between positive emotions, personal resources, and work engagement.

Also, we did not find any relationships between job resources and any of the other research variables. The reason that positive emotions do not build job resources, could be because job resources are dependent on environmental factors, more so than personal resources which are more close to the employees' self. Therefore, it would be more likely to observe significant relationships between positive emotions and personal resources than between positive emotions and job resources. Moreover, although job resources have been found to predict work engagement in previous research (e.g. Xanthopoulou *et al.*, 2009), our study shows that the effects of job resources are "overruled" by individual factors (i.e. positive emotions and personal resources) in the prediction of work engagement. We will not make the statement that the work environment is not important in predicting employees' work engagement; however, we do say that it is important to take the individual factors into account as well.

In summary, our results support the notion that positive emotions only indirectly (and not directly; (Hypothesis 1a) predict work engagement, via the build of personal resources (Hypothesis 1b). However, positive emotions were not related to job resources. Furthermore, we found that only personal resources – and not job resources – were related to work engagement (Hypothesis 1c). So, although the reciprocal models fitted the data best, not all reciprocal relationships appeared significant (Hypothesis 2). All in all, Hypothesis 1a was rejected, whereas Hypotheses 1b, 1c, and 2 were partly confirmed. In conclusion, our study adds to the existing literature in the sense that our research model entailed positive emotions as a "novel" variable in the context of resources and work engagement. Including positive emotions in our model seemed relevant since they had a reciprocal relationship with personal resources, which in turn were related to work engagement. So, by adding positive emotions to a model of personal and job resources, and work engagement, we were able to integrate B&B theory into the motivational process of the JD-R model. This combined model recognizes the building capacity of positive emotions as well as the potential of personal resources in predicting work engagement.

Limitations and research suggestions
This study consisted of a longitudinal sample with a reasonable large sample size. Despite these strong points of the study, there were also some limitations. Even though the design was longitudinal, causal conclusions should be interpreted with caution. Because we exclusively used self-report measures to assess positive emotions, resources, and work engagement, the cross-paths might have been inflated. However, because of the affective and cognitive nature of the study variables, it is difficult to see in what other way our study variables could have been measured. Finally, CFA's showed that the study variables were correlated though separate constructs, in that the four-factor model fitted the data better than the one-, two-, and three-factor models. Nonetheless, in future research objective measures would be of added value to separate objective from perceived changes (Weigl *et al.*, 2010). That way, it would be possible to actually test the promise of positive gain cycles, not only for the wellbeing of employees, but also for their performance and thus organizational profits.

The current design, a long-term questionnaire study, is not the most optimal way to assess short-term positive emotions and their effects on resources and engagement. We tried to remedy this by asking the participants about the experiences of positive emotions for the last couple of weeks to assess a so-called "mean level" of positive

emotions of the past few weeks. Obviously, a (diary) study in which positive emotions are assessed at a daily level would have been more ideal to test the effects of short-term positive emotions over longer periods of time (see for example Ouweneel *et al.*, in press).

Finally, it has been suggested previously (Xanthopoulou *et al.*, 2009; Weigl *et al.*, 2010) that correlational studies are not best suited to test gain cycles; strictly speaking, experimental or intervention studies are required. More specifically, future studies should focus on inducing positive emotions or resources in an experimental setting or by means of interventions to really test for their added value in predicting engagement, and to control for external factors that influence the mean scores of positive emotions, resources, and engagement.

Practical implications
Our results showed that taking individual factors into account is fertile in the prediction of work engagement. This knowledge is very important for practitioners and managers in enhancing workers' engagement, in that it is relevant to create positive experiences and strengthen personal resources in the workplace. In other words, not only workplace programs to develop job resources (e.g. Cifre *et al.*, 2011) are valuable, individual programs to enhance personal resources (e.g. Demerouti *et al.*, 2011; Luthans *et al.*, 2006) and positive emotions could have potential to (indirectly) increase work engagement as well. Research has shown that positive emotions can be boosted by means of meditation (Fredrickson *et al.*, 2008), expressing gratitude (Sheldon and Lyubomirsky, 2006), and sharing good news (Gable *et al.*, 2004). By applying these practices at work, positive emotions may trigger gain cycles among employees – or even gain spirals, which indicate increased levels of positive emotions, resources, and work engagement over time, next to positive reciprocal relationships – that are beneficial to both employees and organizations. In essence, our results imply that it is possible to use both workplace and individual intervention strategies to enhance work engagement. However, short-lived activities like expressing gratitude and sharing good news also have great potential in this respect.

Next to the positive effects of personal resources on work engagement, personal resources also play an important role in careers of employees. Indeed, previous Finnish studies have shown that personal resource building interventions had positive effects on several career-related variables such as career management preparedness (Vuori *et al.*, 2012) and both employment and personal career planning (Koivisto *et al.*, 2007). So, personal resources do not only point to the fact that employees feel good towards their work, i.e. experience positive emotions at work and are engaged in their work, but also support employees in proactively managing their careers.

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