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Does a positive gain spiral of resources, efficacy beliefs and engagement exist?☆

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Abstract

The present study among 110 Spanish university students expands previous research on work engagement by investigating the causal relationships between two potentially important resources in the use of Information & Communication Technology (i.e., time control and method control), efficacy beliefs and engagement. More specifically, two questions are addressed: (1) do personal resources mediate the relationship between task resources and work engagement? (2) does engagement increase personal and task resources? Results show that efficacy beliefs play a mediating role between task resources and engagement. Engagement increases efficacy beliefs, which in turn increase task resources over time. These findings suggest a positive gain spiral in which efficacy beliefs play a central role.

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1. Introduction

Recent studies have suggested that job resources are related to work engagement through a process of work motivation (Bakker, Demerouti, De Boer, & Schaufeli, 2003; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004). However, these studies were cross-sectional in nature and only one type of resources (i.e., task resources) was included. The present longitudinal and experimental study expands previous research on engagement by disentangling the (reversed) causal relationships between work task resources (i.e., time control and method control), personal resources (i.e., efficacy beliefs), and work engagement. More specifically, two research questions are addressed: (1) do personal resources mediate the relationship between task resources and work engagement? (2) does engagement increase personal and task resources? If the answer to both questions is affirmative, a reciprocal causal relationship would exist that is indicative of the "gain spiral" proposed by the Conservation of Resources (COR) Theory (Hobfoll, 1989, 2001). That is, task resources would foster efficacy beliefs and work engagement, which in turn would have a positive impact on efficacy beliefs and task resources.

2. The motivational potential of job resources

Several studies have pointed to the motivational potential of (job) resources. For instance, according to Job Characteristics Theory (JCT; Hackman & Oldham, 1976, 1980) every job has a specific motivational potential that depends on the presence of five core job characteristics: i.e., skill variety, task identity, task significance, autonomy, and feedback. The presence of these resources is linked to positive outcomes such as high quality work performance, job satisfaction, low absenteeism, low turnover, and high work motivation (Fried & Ferris, 1987; Tierney & Farmer, 2002). The Conservation of Resources (COR) Theory also states that job resources may potentially be motivating in their own right through the creation, maintenance and accumulation of resources (Hobfoll, 1989). Resources are defined as "... those objects, personal characteristics, conditions, or energies that are valued by the individual or that serve as a means for attainment of these objects, personal characteristics, conditions or energies" (Hobfoll, 1989, p. 516). For example, job control and efficacy beliefs are considered to be resources, in the same way as health and well-being, since they are valued and sought after. The basic tenet of COR-theory is that "... people strive to retain, protect, and build resources and what is threatening to them is the potential or actual loss of these valued resources" (Hobfoll, 1989, p. 516). Consequently, stress is produced when resources are threatened, or lost, and when individ-

uals invest resources and do not reap the anticipated level of benefits. Furthermore, COR theory assumes that resources may diminish as a result of so-called "loss spirals" and that resources may increase as a result of "gain spirals" (Hobfoll, 2001). The former implies that people who lack resources are susceptible to losing even more resources. On the other hand, gaining resources increases the resource pool, which makes it more likely that additional resources will subsequently be acquired. Resource loss decreases motivation, and may eventually lead to burnout (Demerouti, Bakker, & Bulters, 2004; Hobfoll & Freedy, 1993), whereas resource gain increases motivation and well-being (Hobfoll, 2001; see also Houkes, Janssen, de Jonge, & Nijhuis, 2001).

Finally, the Job Demands-Resources (JD-R) model (Bakker et al., 2003; Bakker, Demerouti, & Verbeke, 2004; Demerouti et al., 2001; Schaufeli & Bakker, 2004) constitutes a heuristic and parsimonious model that specifies how health impairment (e.g., burnout) and motivation (e.g., work engagement) may be produced as a consequence of two sets of working conditions: job demands and job resources, respectively. It is an overarching model that can be used, irrespective of the particular demands and resources of a specific job. According to the JD-R model, job resources are those aspects of the job that are functional in achieving work goals, reduce job demands, or stimulate personal growth and development (see Demerouti et al., 2001). The central proposition of the JD-R model is that job demands and job resources each evoke two different processes: job demands drain the employee's energy resources, thus leading to burnout and health impairment, whereas the availability of job resources stimulates employee motivation in the form of work engagement and positive work outcomes such as organizational commitment (Schaufeli & Bakker, 2004). That is, work environments that are characterized by many resources foster the willingness to dedicate one's efforts and abilities to the work task, which in that case is likely to be accomplished successfully (see also Meijman & Mulder, 1998). It is plausible that successful goal accomplishment is accompanied by work engagement.

Work engagement is defined as a persistent, pervasive and positive affective-motivational state of fulfilment in employees (Schaufeli, Salanova, González-Romá, & Bakker, 2002). It is composed of three dimensions: vigor, dedication, and absorption. *Vigor* refers to high levels of energy and mental resilience while working, the willingness to invest effort in one's work, the ability to not be easily fatigued, and persistence in the face of difficulties. *Dedication* refers to a strong involvement in one's work, accompanied by feelings of enthusiasm and significance, and by a sense of pride and inspiration. Finally, *absorption* refers to a state in which individuals are fully concentrated on and engrossed in their activities, whereby time passes quickly and they have difficulties in detaching themselves from work. Although originally three dimensions of work engagement were distinguished, recent empirical research suggests that vigor and dedication constitute the core dimensions (Llorens, García, Salanova, & Cifre, 2003; Schaufeli & Bakker, 2004; Storm & Rothmann, 2003), which are the direct opposites of the dimensions of burnout (exhaustion and dedication, respectively). Therefore, this study includes only these two indicators of engagement.

3. Reciprocal relationships

Most occupational stress studies are cross-sectional in nature so that no causal inferences can be made and reversed causation cannot be ruled out. For instance, Zapf, Dormann, and Frese (1996) reviewed 16 longitudinal studies on job stress, of which six provide evidence for reversed causation. That is, instead of job stressors leading to strain, it was found that strains such as job dissatisfaction and emotional exhaustion lead to higher perceived levels of stressors such as work overload and work-home interference. Also, reversed causal relationships between resources and mental health have been observed. For instance, Schwarzer, Hahn, and Jerusalem (1993) found that mental health predicted levels of social support, instead of the other way around.

So far, only a few studies have been conducted that combine causal and reversed causal effects into one model of reciprocal causation. In a longitudinal study, Demerouti et al. (2004) showed that work pressure leads to work-home interference and to exhaustion; and vice versa, that exhaustion results in more work-home interference and work pressure. In a similar vein, De Lange, Taris, Kompier, Houtman, and Bongers (2004) found evidence for reciprocal effects between work characteristics and health, showing that high job demands lead to ill-health, whereas ill-health is associated with higher job demands across a three-year period. Reciprocal effects have also been shown between efficacy beliefs and burnout in a two-wave longitudinal study among teachers (García, Llorens, & Salanova, 2003). That is, poor efficacy beliefs lead to burnout, and vice versa. The previous studies are indicative of the existence of a loss-spiral: job stressors could lead to resource loss (i.e., health impairment), which via increased job stress would lead to further loss of resources.

Finally, only one longitudinal study has been carried out that is suggestive of the existence of gain spirals. Llorens et al. (2003) studied the affective antecedents (i.e., burnout and engagement) of self-efficacy in a sample of 274 Spanish secondary-school teachers, using two waves (Time 1 and Time 2). Results of structural equation modeling provide strong evidence for the mediating role of burnout and engagement in the relationship between obstacles and facilitators on the one hand, and self-efficacy on the other. Particularly relevant to the present study are findings from the study by Llorens et al. (2003) showing that job resources (e.g., easy access to information and relevant materials) increase work engagement and future efficacy beliefs, and in the reversed direction, engagement and efficacy increase the availability of resources. This process continues over time so that a positive "gain spiral" model of efficacy builds up. These results provide evidence in favor of the motivation process of the JD-R model (Bakker et al., 2003; Demerouti et al., 2001) and show empirical support for the motivational boost of efficacy beliefs found in previous cross-sectional studies with university students (Salanova, Bresó, & Schaufeli, 2004).

4. The present study: resources, efficacy beliefs and engagement

The present longitudinal study focuses on the causal relationships between task resources, efficacy beliefs and engagement in a sample of university students in a

laboratory setting. More specifically, it refers to ''gain spirals''. Recently, Salanova (2003) showed the mediating role of engagement in the relation between academic success and efficacy beliefs among university students. That is, academic success had a positive influence on efficacy beliefs via engagement. Another study among Spanish and Belgian university students suggested that past academic success enhances levels of efficacy beliefs, which in turn increases engagement and boosts future efficacy beliefs (Salanova et al., 2004). Although these results suggest the existence of a gain spiral, definite conclusions cannot be drawn because a cross sectional design was used. Therefore, the current study employs a longitudinal design.

As noted previously, efficacy beliefs play a pivotal role because they are expected to mediate the relationship between task resources and engagement (see Fig. 1). According to Social Cognitive Theory (Bandura, 1997, p. 3; for a revision see also Garrido, 2000), efficacy beliefs are defined as the ''beliefs in one's capabilities to organize and execute the course of action required to produce given attainments''. Although research often does not explicitly differentiate between *generalized* (Schwarzer, 1999) and *specific* efficacy beliefs, previous research supports the use of specific measures of efficacy beliefs in specific domains since it produces more robust results (e.g., Grau, Salanova, & Peiró, 2000; Salanova, Peiró, & Schaufeli, 2002). Therefore, in the current study, instead of generalized efficacy, we included a specific measure of work-related efficacy. In the field of work, Cherniss (1993) introduced the concept of professional efficacy, understood as the belief in the ability to correctly fulfill one's professional role, and operationalized it using the corresponding scale of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996).

Bandura's (1997; see also Garrido, 2000) efficacy beliefs are based on judgments of one's own capabilities, of which control is the key aspect. Success leads people to rely on their own competence, thereby experiencing higher levels of efficacy, following a pattern of a positive gain spiral. In our study, we distinguished between two aspects of control that act as job resources: time control and method control. Moreover, people also partly rely on their emotional states to judge their capabilities. They interpret their affective states as signs of efficacy; that is, positive affective states such as engagement enhance perceived efficacy beliefs, which is, for instance, shown among ICT employees (Chen, Wigland, & Nilan, 1999; Salanova, Grau, Llorens, & Schaufeli, 2001) and students (Salanova, 2003; Salanova et al., 2004). Moreover, Social Cognitive Theory (Bandura, 1997) also assumes that high levels of efficacy are

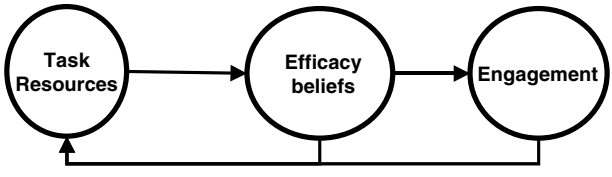

Fig. 1. Theoretical Gain Spiral model.

related to motivation, which in our case is indicated by levels of engagement. There is indeed evidence to show that efficacy beliefs may act as an important determinant of the effort and persistence in pursuing goals (Bandura, 1997). This is in line with the idea that both engagement dimensions (i.e., vigor and dedication) constitute the main characteristics of "motivated" behavior (i.e., effort and persistence) (Katzell & Thompson, 1990; Locke & Latham, 1990). In other words, people are motivated at work when they feel vigorous and are dedicated to doing their work.

In sum, our research model (see Fig. 1) focuses on the mediating role of specific work-related efficacy beliefs in the relationship between task resources (i.e., time and method control) on the one hand, and work engagement (i.e., vigor and dedication) on the other hand (Hypothesis 1). Moreover, our model proposes reciprocal relationships between task resources, efficacy beliefs and engagement. In addition to the effect of task resources on engagement (via efficacy beliefs) it is hypothesized that work engagement leads to stronger efficacy beliefs (Hypothesis 2a), and more perceived task resources (Hypothesis 2b).

5. Method

5.1. Participants and procedure

A two-wave longitudinal study was carried out in a laboratory setting among 110 psychology students (85% females and 15% males) from Universitat Jaume I (Castellón, Spain). Ages ranged from 21 to 31 and the mean age was 22.58 years (SD = 1.63). The participation in the study was voluntary and the sessions were run in 22 groups of five members each, who were randomly distributed across groups. The members of each group had never done activities together before, so the groups in the study may be considered as new or emergent ones. The groups carried out the tasks using the *mIRC32* chat software in a laboratory with an intranet and five work-stations. In order to solve the tasks, each subject could only communicate with the rest of the group members by computer, and any direct or personal contact was avoided. All subjects received the same information about the study. Before the first session, the groups were trained in the use of the *mIRC32*by the experimenter.

To avoid the learning effect (Rowden, 2003; Ziessler & Nattkemper, 2001) all groups performed two tasks: an innovative task (Task 1) and an intellective task (Task 2) in two separate experimental sessions. Both tasks were first solved individually and then a group decision was made based on a group discussion. In Task 1 (innovative task) participants had to come up with a slogan to promote house sales in a specific area of Spain. The individual Task 1 consisted of generating three slogans without interacting with any other group member. Next, participants communicated with each member of their group (using chat) and finally, the five best slogans were selected at group level.

After three weeks, the same groups met again in the second experimental session to perform Task 2. This time, groups performed an intellective task consisting of

associating the name, surname and job of four employees from a specific company. Each member had only partial and complementary instructions to solve the task, so that all information had to be brought to the group in order to solve the task correctly. To avoid communication between groups about the correct solution to the task, a prize of £120 was promised for the best group performance. Moreover, the experimenters varied the names of the task examples in each group, but of the same level of difficulty.

5.2. Instruments

Time control was measured with four items adapted from Jackson, Wall, Martin, and Davis (1993) that refer to the extent to which group members have the freedom to make decisions regarding the time invested in the task (e.g., 'I can decide when to start with this specific task'). *Method control* was measured with four items that determine the degree to which members of the group have the freedom to make decisions regarding to how to do the task (e.g., 'I can determine how many tasks I am going to do') (Van de Ven & Ferry, 1980). Items for both task resources were scored on a five-point Likert scale (1 = not at all, 5 = to a large extent). The psychometrical properties (i.e., means, standard deviations, correlations and internal consistencies) of all research instruments are presented in Table 1.

Work engagement was assessed by using the vigor and dedication subscales of the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002) that had been slightly adapted for use in work groups. Vigor (VI) is measured by 6 items (e.g., 'During the task, I felt full of energy') and dedication (DE) is measured by 5 items (e.g., 'My group felt enthusiastic about the task'). Both scales were scored on a five-point Likert scale (1 = never, 5 = most of the time).

Efficacy beliefs were measured by 6 items of the Spanish version (Salanova et al., 2001) of the professional efficacy scale of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli et al., 1996) that had been slightly adapted for use in

Table 1
Descriptive statistics for all study variables ($N = 110$)

	M	SD	α	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Method control T1	3.03	.61	.74									
2. Method control T2	3.13	.56	.76	.37***								
3. Time control T1	3.27	.61	.67	.30**	.26***							
4. Time control T2	3.33	.61	.77	.22*	.47***	.43***						
5. Efficacy beliefs T1	4.04	.87	.75	.31**	.23**	.32***	.33***					
6. Efficacy beliefs T2	4.11	.89	.78	.15*	.25***	.17*	.35***	.48***				
7. Vigor T1	2.90	1.01	.73	.22*	.17*	.23**	.23**	.36***	.28***			
8. Vigor T2	2.98	.98	.76	.18*	.29***	.24**	.31***	.38***	.46***	.68***		
9. Dedication T1	3.49	1.24	.88	.14*	.14*	.23**	.27***	.46***	.26**	.67***	.56***	
10. Dedication T2	3.18	1.12	.88	.19**	.23**	.25***	.29***	.44***	.55***	.56***	.81***	.61***

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

work groups. An example item is: 'During the task, I was sure that I was efficacious in completing the activity'. Items were scored on a seven-point Likert scale (0 = never, 6 = always).

5.3. Data analyses

Structural Equation Modeling (SEM) methods as implemented by the AMOS software program (Arbuckle, 1997) using Maximum Likelihood Estimation methods, were used to establish the relationships between the model variables. Time control and method control were used as indicators for the latent factor 'task resources', whereas vigor and dedication were used as indicators of the latent 'engagement' construct. Professional efficacy was used as the only indicator of efficacy beliefs. First, the *Stability Model* (M1) was tested without cross-lagged structural paths but with temporal stabilities and synchronous correlations. Temporal stabilities were specified as correlations between the corresponding constructs at T1 and T2. M1 estimates the total stability coefficient between T1 and T2 without specifying the variance in direct or indirect paths (Pitts, West, & Tein, 1996). Secondly, the fit of this stability model was compared to that of three more complex models: (a) the *Causality Model* (M2), which is identical to M1 but includes additional cross-lagged structural paths from T1 task resources to T2 efficacy beliefs and to T2 engagement, as well as from T1 efficacy beliefs to T2 engagement; (b) the *Reversed Causation Model* (M3) which is also identical to M1, but includes additional cross-lagged structural paths from T1 engagement to T2 efficacy beliefs and T2 task resources, as well as from T1 efficacy beliefs to T2 task resources; (c) the *Reciprocal Model* (M4), which includes reciprocal relationships between task resources, efficacy beliefs and engagement and thus includes all paths of M2 and M3. In addition, the measurement errors of the corresponding indicators of T1 and T2 were allowed to covary over time. For example, a covariance is specified between the measurement error of vigor at T1 and the measurement of vigor at T2. While in the case of cross-sectional data, measurement errors should generally not covary, in longitudinal measurement models the errors of measurement corresponding to the same indicator should covary over time. According to Pitts et al. (1996) this accounts for the systematic (method) variance that is associated with each specific indicator (McArdle & Bell, 2000; Pitts et al., 1996). In fact, failing to specify the covariances between the measurement errors leads to high stability coefficients and a poor fit of the model.

Fit indices. Maximum likelihood estimation methods were used and the input for each analysis was the covariance matrix of the items. The goodness-of-fit of the models was evaluated using the following absolute goodness-of-fit indices (cf. Jöreskog & Sörbom, 1986): (1) the χ^2 goodness-of-fit statistic; (2) the Root Mean Square Error of Approximation (RMSEA); (3) the Goodness of Fit Index (GFI); (4) the Adjusted Goodness of Fit Index (AGFI). Moreover, four relative goodness-of-fit measures were calculated: (1) Normed Fit Index (NFI); (2) Non-Normed Fit Index (NNFI); (3) Comparative Fit Index (CFI), and (4) Incremental Fit Index (IFI). Since the distribution of the GFI and the AGFI is unknown, no statistical

test or critical value is available (Jöreskog & Sörbom, 1986). Values smaller than .08 for RMSEA are indicative of an acceptable fit, and values greater than 0.1 should lead to model rejection (Cudeck & Browne, 1993). For all four relative fit-indices, as a rule of thumb, values greater than .90 are considered as indicating a good fit (Hoyle, 1995).

6. Results

Table 1 displays the means, standard deviations, internal consistencies (Cronbach's α), stabilities, and intercorrelations of all study variables. All alpha values meet the criterion of .70 (Nunnaly & Bernstein, 1994), with one exception (time control at T1). The highest test-retest reliabilities were observed for dedication and vigor, followed by efficacy beliefs, method control and time control, respectively. Generally speaking, the pattern of correlations shows that, as expected, task resources (i.e., time control and method control) are positively related to efficacy beliefs and engagement (vigor and dedication) at T1 and at T2. In the same way, efficacy beliefs are positively correlated with engagement in both waves.

6.1. Testing the gain spiral model

As can be seen from Table 2, the fit to the data of the causality model (M2) is superior to that of the stability model (M1) ($\Delta\chi^2(2) = 14.11$, $p < .001$). This suggests the relevance of cross-lagged paths from T1 task resources to T2 efficacy beliefs and T2 engagement, as well as from efficacy beliefs at T1 to engagement at T2. Furthermore, the reversed causality model (M3) fitted the data significantly better than the stability model (M1) ($\Delta\chi^2(3) = 15.08$, $p < .01$), and its fit was similar to that of the causality model (M2) ($\Delta\chi^2(1) = .97$, n.s.). This indicates that the model with the cross-lagged path from T1 efficacy beliefs to T2 task resources, and from T1 engagement to T2 task resources and efficacy beliefs, shows a better fit to the data than the model including only temporal stabilities and synchronous correlations

Table 2
Model fit ($N = 110$)

Model	χ^2	df	GFI	AGFI	RMSEA	NFI	NNFI	CFI	IFI	$\Delta\chi 2$	df
M1. Stability	67.49	26	.89	.77	.12	.86	.84	.90	.91		
M2. Causality	53.38	24	.92	.80	.10	.89	.87	.93	.93	M2 − M1 = 14.11**	2
M3. Reversed	52.41	23	.92	.81	.10	.89	.87	.93	.94	M3 − M1 = 15.08*	3
										M3 − M2 = .97	1
M4. Reciprocal	25.68	20	.96	.88	.05	.95	.97	.98	.98	M4 − M1 = 41.81**	6
										M4 − M2 = 27.7**	4
										M4 − M3 = 26.73**	3

Note. χ^2, Chi-square; df, degrees of freedom; GFI, goodness-of-fit index; AGFI, adjusted goodness-of-fit index; RMSEA, root mean square error of approximation; NFI, normed fit index; NNFI, non-normed fit index; CFI, comparative fit index; IFI, inc7remental fit index.

* $p < .01$.

** $p < .001$.

(M1). Finally, it appeared that the reciprocal causation model (M4) with the addition of reciprocal effects was superior to the stability model M1 ($\Delta\chi^2(6) = 41.81$, $p < .001$), the causality model M2 ($\Delta\chi^2(4) = 27.7$, $p < .001$), as well as to the reversed causality model M3 ($\Delta\chi^2(3) = 26.73$, $p < .001$; see Table 2). This means that the theoretical model including cross-lagged reciprocal relationships between task resources, efficacy beliefs and engagement best fits the data. Fig. 2 shows the path coefficients of M4.

The significant paths of the reciprocal model (M4), which overlap with the significant paths of the causality and reversed models, are displayed in Fig. 2. According to the specific structural relationships obtained, it is important to note that all manifest variables loaded significantly on the intended latent factors. All indicators of task resources have loadings on the intended latent factor higher than. 40, both at T1 and T2. Furthermore, the loadings of vigor and dedication on the engagement factor were higher than. 70. The autocorrelations between T1 and T2 are .36 for task resources, .28 for professional efficacy, and .57 for engagement.

What can be said about longitudinal support for Hypothesis 1? Hypothesis 1 asserted that task resources would have lagged positive effects on engagement via efficacy beliefs. The model that includes these causal relationships (M2) resulted in significant lagged and positive effects of T1 task resources on T2 efficacy beliefs ($\beta = .37$, $t = 1.92$, $p < .05$), as well as of T1 efficacy beliefs on T2 engagement ($\beta = .32$, $t = 3.52$, $p < .001$). However, a non-significant effect was obtained of T1 task resources on T2 engagement ($\beta = .02$, $t = .10$, n.s.). Hence, Hypothesis 1 is supported: the availability of task resources (time and method control) increases efficacy beliefs after the completion of the laboratory task, which in turn has a positive impact on levels of engagement three weeks later.

Hypothesis 2a stated that T1 efficacy beliefs would have a lagged positive effect on T2 task resources, and that T1 engagement would have positive effects on T2 efficacy beliefs. The model including these reversed causal paths (M3), also resulted in significant cross-lagged structural relationships. Specifically, a reversed causal effect of T1

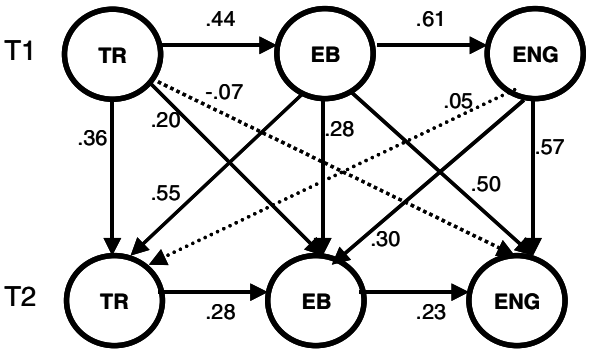

Fig. 2. Structural path coefficients of the reciprocal model ($N = 110$). *Note*. Solid lines represent significant standardized coefficients; Dotted lines are non-significant paths. TR, task resources; EB, efficacy beliefs; ENG, engagement.

efficacy beliefs on T2 task resources ($\beta = .17$, $t = 3.20$, $p < .01$), as well as of T1 engagement on T2 efficacy beliefs ($\beta = .28$, $t = 2.28$, $p < .05$) was observed. Obviously, high levels of engagement after the completion of the laboratory task at T1 increased levels of efficacy beliefs three weeks later. Moreover, the students who had strong efficacy beliefs after completing the laboratory task at T1 perceived more task resources at T2, compared to those with lower levels of T1 self-efficacy. This result confirms Hypothesis 2a. In addition, Hypothesis 2b stated that work engagement leads to more perceived task resources. However, a non-significant reversed effect was obtained of T1 engagement on T2 task resources ($\beta = .02$, $t = .24$, n.s.), so Hypotheses 2b is not supported.

Finally, the results of M4 showed that both causal and reversed causal relationships exist simultaneously. The significant paths of the reciprocal model are graphically presented in Fig. 2. The model explained 28% of the variance in T2 task resources, 14% of the variance in T2 efficacy beliefs and 22% of the variance in T2 engagement. These findings illustrate the pivotal role that efficacy beliefs play in the relationship between task resources and engagement. More specifically, efficacy beliefs play a *mediating* role in the relationship between task resources at T1 and engagement at T2 (Hypothesis 1), and between engagement at T1 and task resources at T2 (Hypothesis 2a). That is, resources at T1 enhance efficacy beliefs at T2, which in turn, foster engagement at T2 (lagged effect). In addition, engaged students at T1 feel more efficacious at T2. Finally, efficacy beliefs at T1 increase the perception of task resources at T2.

7. Discussion

The present longitudinal study among university students working in groups with ICT in a laboratory setting was designed to investigate the role of efficacy beliefs in the relationship between two potential task resources (i.e., time control and method control) and work engagement. These variables were assessed in two different waves with a three-week time lag between each measurement. This design allowed us to test the existence of a positive "gain spiral" of resources, efficacy and engagement by investigating how these variables are related to each other over time. Two central questions have been addressed in this study.

The first question was: "Do personal resources mediate the relationship between task resources and work engagement?" The answer to this question is affirmative. Results of the cross-lagged SEM analyses showed that task resources have a positive effect on efficacy beliefs, which in turn show a short-term (3 weeks) lagged effect on engagement. That is, the more task resources the students perceived for completing the task, the higher their levels of efficacy beliefs and the higher their levels of vigor and dedication three weeks later. According to the Social Cognitive Theory put forward by Bandura (1997), the perception of control anticipates task success and consequently levels of efficacy beliefs increase. Moreover, this perception of task efficacy leads to high levels of energy and persistence in the face of demands (i.e., vigor) and fulfillment of personal needs and job identification (i.e., dedication). There is

empirical evidence suggesting that these efficacy beliefs "regulate emotional states by supporting effective courses of action to transform the environment in ways that alter its emotional potential" (Bandura, 2002, p. 137). In this sense, efficacy beliefs act as a self-motivating mechanism: people perceive their own level of competences to be high, and consequently they set themselves goals and are motivated to spend considerable effort and persistence in overcoming obstacles (Bandura, 2001; Garrido, 2000). According to the motivation process that is assumed by the Job Demands-Resources Model (Bakker et al., 2003; Demerouti et al., 2001), the presence of available resources stimulates motivation in the form of engagement and leads to positive outcomes such as efficacy beliefs and organizational commitment (Llorens et al., 2003; Schaufeli & Bakker, 2004).

The second question was: "Does engagement increase personal and task resources?" Indeed, efficacy beliefs seem to play a mediating role between engagement and task resources. The current study showed that students with high levels of engagement felt more efficacious in performing the task, which in turn, led to the perception of greater future task resources. As in previous studies, engagement acts as a "motivating engine" that is fuelled by efficacy beliefs (Salanova et al., 2004). Thus, engagement increases task resources via personal resources (i.e., efficacy beliefs), i.e., vigor and dedication lie at the core of future efficacy beliefs.

According to the Social Cognitive Theory (Bandura, 1997; see also Garrido, 2000) people's personal efficacy beliefs may develop in four different ways. The most effective way of creating a strong sense of efficacy is through mastery experiences. That is, successes build a robust belief in one's personal efficacy, while failures lower it. A second way is through the vicarious experiences provided by social models. Social persuasion is a third way of increasing people's efficacy beliefs. Finally, the fourth way, and the focus of our study, is that people also rely on their somatic and emotional states in judging their capabilities. People interpret their stress reactions and tensions as signs of inefficacy, whilst positive emotional states (in our study, work engagement) enhance efficacy beliefs. When experiencing a positive state of mind (e.g., work engagement) individuals may perceive themselves as more efficacious in performing tasks, which in turn may generate perceptions of greater task resources.

This reasoning also agrees with the Broaden-and-Build Theory of Positive Emotions (Fredrickson, 2001). According to this theory, the experiences of positive emotions broaden people's momentary thought-action repertories, which in turn serves to build their enduring personal resources, which function as reserves to be drawn on later to manage future threats.

Putting our hypotheses together, the crucial question is: "Does a positive gain spiral of resources, efficacy beliefs and engagement exist?" Generally speaking, our results imply that neither of the constructs included in our study can be considered as a single cause or consequence that keeps going the "gain" spiral of resources, efficacy beliefs and engagement. A combination of causation and reversed causation – called reciprocal causation – seems to be the key. That is, task resources increase efficacy beliefs, which, in turn, foster engagement. In addition, engagement boosts future efficacy beliefs, which, in turn, increase the perception of great-

er task resources. Thus, evidence was found for a full mediating role of efficacy beliefs in the gain spiral: task resources predict future engagement, and engagement predicts – through efficacy beliefs – future task resources. These short-term reciprocal relationships are consistent with the "gain spirals" as proposed by Hobfoll (1989, 2001). According to his Conservation of Resources (COR) theory, resources are motivators through which individuals strive to maintain, protect and expand their resources in order to offset the possibility of future resource loss. Consequently people develop efficacy beliefs (Bandura, 1997) and positive well-being (e.g., engagement) (Antonowski, 1987; Ryan & Frederick, 1997), thereby generating a positive cycle (Fredrickson, 2001; Salanova et al., 2004). This interpretation is also in line with the Job Characteristics Theory (Hackman & Oldham, 1980), which assumes that the presence of resources is linked to critical psychological states (e.g., work engagement) and to positive outcomes (e.g., efficacy beliefs). Finally, our results are in line with the "gain spiral" model of efficacy beliefs previously tested in students, which show that resources generate higher levels of actual efficacy beliefs, which, in turn, lead to greater future engagement that enhances more task resources, and so on (Llorens et al., 2003; Salanova et al., 2004).

In sum, our findings confirm the *Gain Spiral Model* that specifies reciprocal relationships between task resources, efficacy beliefs and engagement. This model has previously been studied in a field study (Salanova, 2003) as well as in a laboratory setting (Llorens et al., 2003). An important result of the current study is the confirmation of the pivotal mediating role of efficacy beliefs, which has recently also been obtained by Salanova et al. (2004). Moreover, our results add to other results that emphasize the role of efficacy beliefs in different contexts such as academic performance (Salanova, 2003; Salanova et al., 2004; Schaufeli, Martínez, Marques-Pinto, Salanova, & Bakker, 2002), group performance (Salanova, Llorens, Cifre, Martínez, & Schaufeli, 2003), job stress in Information and Communication Technology (Salanova et al., 2001), and proactive behavior (Salanova et al., 2002).

7.1. Practical and theoretical implications

Regarding theoretical implications, our study results contributed to the validation of "gain spirals" as hypothesized by COR theory (Hobfoll, 1989, 2001). Thus, the present study corroborates previous studies about positive models of efficacy beliefs, but using a longitudinal design in a laboratory context. The study provides evidence that task resources, efficacy beliefs and engagement have reciprocal relationships over time. In addition, results point out the key role of efficacy beliefs as a mediator between task resources and engagement. In terms of practical implications, results emphasize the importance of providing good resources to students that enhance efficacy and engagement, which, in turn, also increase efficacy beliefs, thus closing the spiral by leading to the perception of greater task resources. Although efficacy and engagement are traditionally seen as an outcome, our two-wave longitudinal study shows that both can be considered as causes and consequences in the gain spiral as well.

7.2. Limitations

One of the limitations of this longitudinal study is that the data were obtained by self-report measures and, consequently, the results may be contaminated by the common method variance. Thus, it would be interesting to complement these with more objective measures. Besides, it should be pointed out that the participants in the study were not employees who work in organizations and thus one should be cautious to generalize our findings to this population.

7.3. Directions for further research

Results of this study point to the need to continue longitudinal research on gain spiral models in occupational samples from different countries. Moreover, it would be interesting to use a three-wave panel study, which will allow a more rigorous interpretation of causality and reciprocity than a two-wave panel (Burisch, 2002; Rogosa, Brandt, & Zimowski, 1982). Finally, future studies may test the Gain Spiral Model by including collective measures (i.e., collective engagement, collective self-efficacy) using multi-level methodology.

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