Routledge
Taylor & Francis Group

European Journal of Work and Organizational Psychology

ISSN: 1359-432X (Print) 1464-0643 (Online) Journal homepage: www.tandfonline.com/journals/pewo20

The longitudinal impact of a job crafting intervention

Jessica van Wingerden, Arnold B. Bakker & Daantje Derks

To cite this article: Jessica van Wingerden, Arnold B. Bakker & Daantje Derks (2017) The longitudinal impact of a job crafting intervention, European Journal of Work and Organizational Psychology, 26:1, 107-119, DOI: 10.1080/1359432X.2016.1224233

To link to this article: https://doi.org/10.1080/1359432X.2016.1224233

Published online: 12 Sep 2016.

EUROPEAN JOURNAL OF WORK AND ORGANIZATIONAL PSYCHOLOGY, 2017
VOL. 26, NO. 1, 107–119
http://dx.doi.org/10.1080/1359432X.2016.1224233

Routledge
Taylor & Francis Group

The longitudinal impact of a job crafting intervention

Jessica van Wingerden, Arnold B. Bakker and Daantje Derks

Department of Work & Organizational Psychology, Erasmus University Rotterdam, Rotterdam, Netherlands

ABSTRACT

This study examined the impact of a job crafting intervention based on job demands-resources (JD-R) theory. We hypothesized that the intervention would influence participants' job crafting behaviours, as well as their job demands, job resources, and personal resources. In addition, we hypothesized a positive impact of the intervention on work engagement and self-rated job performance. The study used a quasi-experimental design with a control group. Teachers (N = 75) participated in the job crafting intervention on three occasions with 9 weeks in-between the first and second measurement, and 1 year in-between the second and third measurement. Results showed that the intervention had a significant impact on participants' job crafting behaviours, both at time 2 and time 3. In addition, the results showed a significant increase of performance feedback, opportunities for professional development, self-efficacy, and job performance 1 year after the job crafting intervention. Participants' levels of job demands, resilience, and work engagement did not change. We discuss the implications of these findings for JD-R theory and practice.

ARTICLE HISTORY
Received 5 February 2015
Accepted 6 August 2016

KEYWORDS
JD-R theory; job crafting intervention; job performance; personal resources; work engagement

During the last decade, empirical research has revealed that employees' work engagement is positively related to organizational performance. An influential theory through which we can understand work engagement and its antecedents and outcomes (e.g., job performance) is job demands-resources (JD-R) theory (Bakker & Demerouti, 2014). Accordingly, work engagement and performance can be increased through interventions by targeting the most important job demands and (job and personal) resources (Bakker & Demerouti, 2014). One way to achieve this is to encourage employees to proactively optimize their own job demands and resources. This proactive behaviour is also known as job crafting. Stimulating job crafting behaviour with a job crafting intervention might be a promising tool for enhancing employee work engagement and performance.

Recently, a few job crafting intervention studies have been published (Van den Heuvel, Demerouti, & Peeters, 2012; Van Wingerden, Bakker & Derks, 2016), but none of these have investigated the sustainability of the effects over time. The present study contributes to JD-R theory and to the literature on job crafting by offering a first intervention study that takes longitudinal effects into account. In addition, this is one of the first quasi-experimental intervention studies that created awareness about the current state of participants' job design, in terms of their job demands and resources, and the opportunities participants had to craft their job. The central aim of the present study is to assess the impact of a job crafting intervention on work engagement and performance both immediately after the intervention and 1 year later.

Theoretical background

The rapid technological and economic changes that are characteristic of our society today force organizations and their employees to constantly adapt. For example, teachers can no longer just use their blackboard but have to work with digital devices and learning software as well. Thus, advances outside organizations directly influence employees' jobs. As a consequence, employees may be forced to change their work processes. Additionally, employees may also proactively try to change their jobs themselves. Proactive changes employees make in their job design is known as job crafting—the focal variable of the present study.

Job crafting

Many years before the term "job crafting" was coined by Wrzesniewski and Dutton (2001), several studies had already suggested that employees make self-initiated changes at work (Nicholson, 1984; Staw & Boettger, 1990). A significant redesign of the work may be accomplished without anyone actually executing a planned change programme (Kulik, Oldham, & Hackman, 1987). According to LePine and Van Dyne (1998) these proactive changes that employees make in their job design usually focus on resolving problems for the organization. According to the conventional definitions of job crafting (Tims, Bakker, & Derks, 2012; Wrzesniewski & Dutton, 2001), employees proactively initiate changes in their work environment to optimize the fit between their jobs and their personal needs, abilities, and passions. Thus, the changes employees make through job crafting focus on optimizing their personal

CONTACT Jessica van Wingerden jessica.vwingerden@sn.nl

situation. However, interestingly, research has revealed that job crafting is an approach to job design that may lead to both individual and organizational outcomes. Individual outcomes include better health, well-being, and work engagement (Bakker, Rodriquez-Munoz, & Sanz-Vergel, 2016; Demerouti & Bakker, 2014). According to Wrzesniewski and Dutton (2001), employees may craft their jobs by changing cognitive, task, and/or relational boundaries to shape interactions and relationships with others at work. Through job crafting, employees change the design and social environment of their job.

Because job crafting involves initiating changes in job design, Tims et al. (2012) operationalized job crafting according to the types of job characteristics suggested by the JD-R theory.

Accordingly, every job consists of job demands and resources. Through job crafting, employees can optimize their job demands and resources, which may result in high levels of work engagement and performance (Bakker & Demerouti, 2014). Tims and colleagues argued that job crafting entails the changes individuals make in their level of job demands and job resources by increasing social job resources (e.g., asking for feedback and coaching), increasing structural job resources (e.g., increasing autonomy and creating opportunities to develop oneself at work), increasing challenging job demands (e.g., starting new projects), or by decreasing hindering job demands (e.g., reducing workload). Through job crafting, employees can improve the fit between their jobs and their personal needs, abilities, and passions. Since the introduction and conceptualization of job crafting within the JD-R model (Tims et al., 2012), several studies based on this conceptualization and definition were published (e.g., Bakker & Demerouti, 2014; Lu, Wang, Lu, Du & Bakker, 2014; Tims, Bakker, & Derks, 2013). In addition, over the last few years the first studies with an intervention design also taking this approach as a starting point were published. Van den Heuvel et al. (2012) showed that a job crafting intervention could successfully encourage employees to adapt their job demands and job resources. Further, in a qualitative job crafting intervention study among teachers by Van Wingerden, Derks, Bakker, and Dorenbosch (2013), participants indicated that they became more aware of the importance of continuously crafting their job. These studies suggest that a job crafting intervention (i.e., a training) can indeed increase employees' job crafting behaviours.

The intervention designs used in the studies by Van den Heuvel et al. (2012) and Van Wingerden et al. (2013) were based on JD-R theory (Bakker & Demerouti, 2014). One of the core assumptions of the JD-R theory is that every job is characterized by a set of job demands and (job and personal) resources. Besides these job demands and resources, job crafting is included as a core element within JD-R theory (Bakker & Demerouti, 2014). According to JD-R theory, employees can optimize the balance between their job demands and resources through job crafting. Having an optimal level of job demands and resources is an important precondition for work engagement, and, consequently performance. Furthermore, JD-R theory states that engaged employees are more capable of mobilizing their own resources and (challenging) demands. The process of mobilizing resources and (challenging) demands is referred to as job crafting. Altogether, this explains why, theoretically speaking, job crafting is promising strategy to foster work engagement and good performance. First, job crafting can contribute to an optimal balance between demands and resources. Second, once employees become engaged, enduring job crafting behaviour can help them to sustain their engagement and their performance levels.

The job crafting intervention study by Van den Heuvel and colleagues (2012) examined short-term effects by measuring 2 weeks after the participants have participated in the intervention. There are, as far as we know, no job crafting intervention studies that have investigated possible long-term effects. However, both for theory and practice it is important to examine the sustainability of the job crafting effects in term of increased work engagement and performance. In this study, we will therefore measure the effects both 2 weeks and 1 year after the participants have participated in the job crafting intervention (based on JD-R theory). Our first hypothesis reads as follows:

Hypothesis 1: *Participants' level of job crafting will significantly increase after the job crafting intervention (T2 and T3) both compared to their level prior to the intervention (T1) and compared to a control group.*

Job demands and resources

Job demands and resources are the core elements of the job crafting approach developed by Tims and colleagues (2012). Job demands refer to those physical, psychological, social, or organizational aspects of the job that require physical and/or psychological effort and are associated with certain physiological and/or psychological costs (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Job demands that are typically found in the educational field are a high workload, and high levels of emotional and cognitive demands (Hakanen, Bakker, & Schaufeli, 2006; Koppes, De Vroome, Mol, Janssen & Van den Bossche, 2011). Job demands can be challenging, but may turn into job stressors when meeting those demands requires a major effort from employees (Bakker & Demerouti, 2007). Research revealed that a majority (67%) of the employees working in the educational field perceive their job demands are too demanding (Van Grinsven, Elphick, & Van der Woud, 2012). Governmental policies are therefore focussing on actions to lower the high job demands (Jettinghoff, Van Dijk & Scheeren, 2014). We argue that employees' themselves may proactively adapt their job demands through job crafting.

Job resources are those physical, psychological, social or organizational aspects of the job that are functional in achieving work goals, reducing job demands and the associated costs, or stimulating personal growth and development (Demerouti et al., 2001). Job resources that are important for teachers are feedback, and opportunities for professional development (Hakanen et al., 2006). Feedback from school principals, students, or colleagues gives teachers information about their performance at work, which increases the

likelihood of being successful in achieving work goals (Bakker & Bal, 2010). Through opportunities for professional development teachers can learn and apply new knowledge and skills that will improve their performance on the job (Colbert, Brown, Choi, & Thomas, 2008). A longitudinal field study by Tims et al. (2012) showed a significant increase in levels of feedback, and opportunities for professional development between employees who actively crafted their jobs and those who did not. Thus, through job crafting employees can optimize their work environment, which may result in an increase in their job resources.

In the current intervention study, participants make a personal job crafting plan and are encouraged to put the plan into action at their workplace. By doing this, participants may experience how they can optimize their own work environment. In line with the job crafting approach of Tims et al. (2013) and the educational context of this study, we propose that participants' job demands will decrease after the job crafting intervention and in contrast their job resources will increase. Or, more formally, we hypothesize:

Hypothesis 2: *Participants' levels of workload (2a) and emotional demands (2b), will significantly decrease after the job crafting intervention (T2 and T3) both compared to their level prior to the intervention (T1) and compared to a control group.*

Hypothesis 3: *Participants' levels of feedback (3a), and opportunities for professional development (3b) will significantly increase after the job crafting intervention (T2 and T3) both compared to their level prior to the intervention (T1) and compared to a control group.*

In addition to the proposed intervention effects, our theoretical arguments suggest that a job crafting intervention influences job demands through (changes in) job crafting behaviour. In line with JD-R theory (2014), we propose that the relationship between the job crafting intervention and job demands is mediated by (changes in) job crafting behaviour. Further, we propose a similar mediation for job resources. Thus, we hypothesize:

Hypothesis 2c: *J.ob crafting behaviour mediates the relationship between the job crafting intervention and participants' job demands.*

Hypothesis 3c: *Job crafting behaviour mediates the relationship between the job crafting intervention and participants' job resources.*

Personal resources

Employees who proactively craft their job give direction and meaning to their work life. Through job crafting, employees may experience that they are in control of their work environment, which may contribute to their personal resources. Personal resources have been defined as aspects of the self that are commonly associated with resiliency and individuals' sense of ability to control and impact upon their environment successfully (Hobfoll, Johnson, Ennis, & Jackson, 2003). Examples of personal resources are hope, optimism, resilience, and self-efficacy (Luthans, Youssef, & Avolio, 2007). A study by Bakker and Xanthopoulou (2013) revealed that resilience and self-efficacy are important personal resources in the educational field. Resilience is characterized by positive coping and adaptation in the face of significant risk or adversity (Masten, 2001). Applied to the workplace, resilience is defined as the "positive psychological capacity to rebound, to 'bounce back' from adversity, uncertainty, conflict, failure, or even positive change, progress, and increased responsibility" (Luthans, 2002, *p*. 702). Self-efficacy can be defined as the "beliefs in one's capabilities to organize and execute the course of action required to produce given attainments" (Bandura, 1996, *p*. 3). Employees who are self-efficacious have the confidence to take on and put in the necessary effort to succeed at challenging tasks (Luthans et al., 2007). According to JD-R theory (Bakker & Demerouti, 2014), personal resources are important predictors of motivation and these resources can be optimized through job crafting. Employees who adapt their work environment through job crafting may, for example, feel self-efficacious because they experience they can proactively optimize their work situation.

In addition, Berg, Dutton, and Wrzesniewski (2007) argued that job crafting leads to various positive outcomes like an increase of personal resources because active job crafters experience increased competence and feel able to cope with future adversity. For example, employees may aim to increase their structural job resources by developing themselves professionally. Employees can professional develop themselves by following a masterclass, training, or course, but also by learning on the job from their colleagues. In both situations, employees need to discuss the possibilities (from practical, financial, and time perspective) with their supervisor and/or their co-workers. It therefore may take some time to start and complete the intended professional development, which over time may result in increased levels of job resources. Professionally developing oneself may not only help to gain new knowledge and skills that can be applied in the job, but may also strengthen one's self-efficacy. Therefore, it is to be expected that employees will undertake similar initiatives in the future. In line with JD-R theory (2014), a recent intervention study revealed that participants' levels of self-efficacy significantly increased after a job crafting training (Van den Heuvel, Demerouti & Peters, 2015).

In the present intervention study, participants were encouraged to proactively adapt their job demands and job resources. By doing this, participants may optimize their levels of demands and resources and experience control over their work environment, which may foster resilience and self-efficacy. We therefore propose that participants' personal resources would significantly increase after the job crafting intervention. We hypothesize:

Hypothesis 4: *Participants' levels of resilience (4a) and self-efficacy (4b) will significantly increase after the job crafting intervention (T2 and T3) both compared to their level prior to the intervention (T1) and compared to a control group.*

In addition to the proposed intervention effects, our theoretical arguments suggest that a job crafting intervention influences personal resources through (changes in) job crafting behaviour. In line with JD-R theory (2014), we propose that the relation between the job crafting intervention and personal resources is mediated by (changes in) job crafting behaviour. Thus, we hypothesize:

Hypothesis 4c: *Job crafting behaviour mediates the relationship between the job crafting intervention and participants' personal resources.*

Work engagement and job performance

Work engagement is defined as a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption (Schaufeli, Salanova, González-romá, & Bakker, 2002, *p*. 74). Vigour is characterized by mental resilience and high levels of energy during the workday, the willingness to put effort into one's work, and persistence even in the face of difficulties. Dedication refers to employees' strong involvement and their experience of significance, enthusiasm, inspiration, pride, and challenge at work. Finally, absorption is characterized by being fully focused and happily engrossed in one's work, where time passes quickly. Work engagement can be predicted using the JD-R model (Bakker & Demerouti, 2014), in which job and personal resources are postulated to be the most important predictors. The JD-R model suggests that the combination of high demands and high resources leads to high levels of motivation, involvement, and work engagement (Tuckey, Bakker, & Dollard, 2012), which in turn leads to high levels of performance (Bakker & Demerouti, 2014). Employees may be able to increase their own work engagement and performance through job crafting by optimizing their job demands and resources. Several survey and diary studies have revealed a positive relationship between job crafting and work engagement (e.g., Bakker, Tims, & Derks, 2012; Petrou, Demerouti, Peeters, Schaufeli, & Hetland, 2012) and between job crafting and performance (e.g., Bakker et al., 2012; Lyons, 2008; Tims et al., 2012). While there are numerous definitions of job performance, in this study we are specifically interested in in-role performance. In-role performance is defined as those officially required outcomes and behaviours that directly serve the goals of the organization (Motowidlo & Van Scotter, 1994). In the educational field, Leana, Appelbaum, and Shevchuk (2009) have found that educators who took part in collaborative job crafting (in which employees work together to redesign their jobs) displayed improved performance compared with those who did not engage in job crafting.

A job crafting intervention may teach employees how to optimize their work environment and improve the fit between their job and their personal needs, abilities, and passions, which may result in higher work engagement and improved performance (Demerouti & Bakker, 2011). In this intervention study, participants are encouraged to optimize their own work environment through job crafting during a period of 4 weeks. Consequently, participants' own job crafting behaviour is an essential part of the intervention. By experiencing how job crafting can contribute to their work life, participants may continue to engage in job crafting after the intervention and integrate it with their common job activities. Employees may use the job crafting skills when their work environment changes or when personal needs change, which enables them to stay engaged and perform well. We hypothesize:

Hypothesis 5: *Participants' levels of (a) work engagement and (b) in-role performance will significantly increase after the job crafting intervention (T2 and T3) both compared to their level prior to the intervention (T1) and compared to a control group.*

In addition to the proposed intervention effects, our theoretical arguments suggest that a job crafting intervention influences work engagement and performance through (changes in) job crafting behaviour. In line with JD-R theory (2014), we propose that the relation between the job crafting intervention and work engagement is mediated by (changes in) job crafting behaviour. Further, we propose a similar mediation of the relation between the job crafting intervention and performance. Thus, we hypothesize:

Hypothesis 5c: *Job crafting behaviour mediates the relationship between the job crafting intervention and participants' work engagement.*

Hypothesis 5d: *Job crafting behaviour mediates the relationship between the job crafting intervention and participants' performance.*

Method

Participants and procedure

The sample consists of 62 female (83%) and 13 male teachers (17%) who work at primary schools for children with special educational needs. These percentages are representative for the occupational group. The mean age of the participants was 45 years (SD = 10.05), and 87% successfully finished a higher vocational education or university education in special education needs. The participants worked at two different schools of the same organization. Because of practical reasons, participants of the intervention groups and the control group were grouped by location, resulting in a quasi-experimental design. By following this procedure, we avoided contamination effects, where members of the experimental groups influence members of the control group or vice versa (Cook & Campbell, 1979). Of the 75 teachers who were contacted to participate, 45 participants took part in the job crafting intervention, while 30 participants were assigned to the control group. The teachers participated voluntarily and did not receive any compensation for their contribution.

There were three measurements in time. The first measurement took place 2 weeks before the start of the intervention; the second measurement took place 2 weeks after the intervention was completed; the third measurement took place

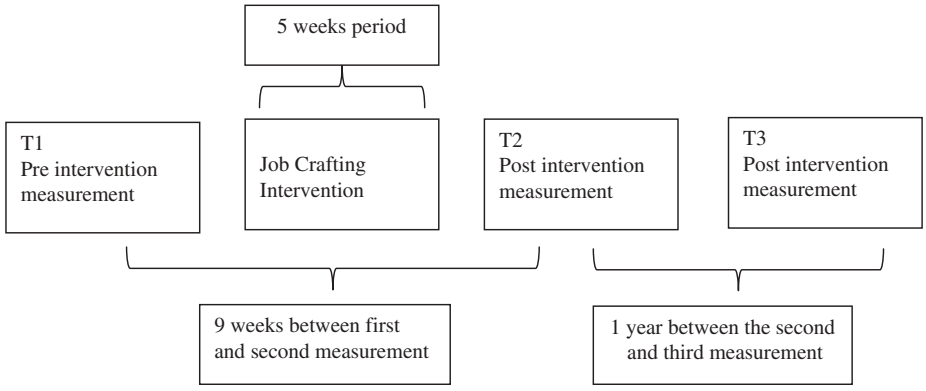

Figure 1. Research design.

1 year after the second measurement (see also Figure 1). All 75 participants completed the first and second questionnaire (100% response rate), while 71 participants completed the third questionnaire (95% response rate). Two weeks before the start of the intervention, the managing director introduced the first questionnaire in an email containing instructions and a link to the online questionnaire. The procedure and goals of the study were explained, while also addressing the anonymity of the data. One week before the start, the participants received a reminder to fill in the questionnaire and additional information about the content of the intervention. Two weeks after the intervention was completed, the participants were asked to fill in the second questionnaire, and 1 year later they were asked to fill in the third questionnaire.

Job crafting intervention

The job crafting intervention was based on the Michigan Job Crafting Exercise (JCE) (Berg, Dutton, Wrzesniewski, & Baker, 2008) and operationalized using the principles proposed by JD-R theory (Bakker & Demerouti, 2014). Specifically, the job crafting intervention consists of exercises and goal setting aimed at increasing social job resources, increasing challenging job demands, increasing structural job resources, and decreasing hindering job demands. In this job crafting intervention, we follow the principles of what Parker, Bindl, and Strauss (2010) describe as *proactive goal-setting*. A proactive goal is something to be achieved in the future. Parker et al. (2010) posit that in the process of proactive goal-setting, the motivation to achieve a goal depends on: (a) the assessment of whether one can achieve the future goal, (b) the reason to achieve it or level of importance felt, and (c) whether one feels supported and stimulated—or "energized"—to achieve the goal. Parker and colleagues (2010) further describe the different phases that are important to setting and pursuing proactive goals:—proactive goal envisioning: the awareness of a desirable future work situation;—proactive goal generation: setting concrete and realistic goals that contribute to this;—proactive goal planning: describing the ways and means to achieving the goal;—proactive goal striving: the actual pursuit of the goal set.

The goals that employees set themselves should be geared to the short term. They are feasible goals (*generation*) that can be achieved by training in a job crafting intervention in which job fits or job misfits can be visualized (*envisioning*). Through training, the roughly formulated goals can be refined and discussed in a group setting and in terms such as the ways and means necessary to achieving the goal. Concrete job crafting actions can be proposed and participants themselves take note of them (*planning*). After this, participants put the actions into effect in order to achieve the goals set (*striving*).

The job crafting intervention consisted of two training sessions over a period of 6 weeks: the first session took place on 1 day, while the second session of half a day took place 4 weeks later (see also Figure 2). The practical examples incorporated in the training and the text and pictures in the workbook were adapted to the specific needs of employees in the educational sector. The programme involved six core elements and took place over a total of 12 hours, divided into two meetings over a period 6 weeks. During the job crafting

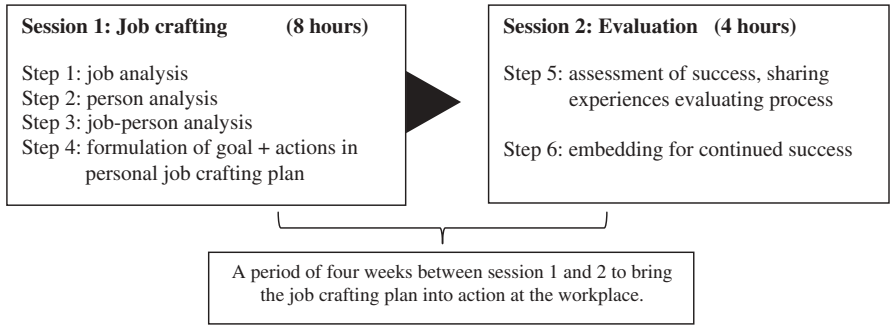

Figure 2. Design of the intervention.

intervention, the participants went through six steps. The first step (job analysis) was for them to summarize all their current tasks/duties and place them in order of the amount of time they require, from little to medium to a lot of time. The participants made an overview of their job tasks and sorted them into three task categories: tasks they spent a lot of time on, tasks they had to do often, and tasks that they had to do sometimes. They also designated whether they did the task individually or with colleagues. The participants wrote the outcomes on small, medium, and large post-it notes and stuck them on a piece of brown paper. After this, they labelled their tasks in terms of urgency and importance.

The second step (person analysis) was to assess their personal strengths, motives and the personal or organizational hindrances they experienced in their work. By asking participants to also think about what obstacles they felt in their work, the training programme deviates slightly from the original Job Crafting Exercise (Berg et al., 2008) in which this aspect is not explicitly explored. Specifically identifying the hindrances in their work helped participants to make the connection with the job crafting dimensions proposed by Tims et al. (2012), which involves activities to decrease the number or extent of burdensome tasks. In the third step (job + person analysis) participants coupled their own strengths, motives, and obstacles with the tasks/duties they carry out. The objective of the analysis was to make participants aware of those specific work tasks that reinforce personal strengths and motives and thereby align what they are good at with what they actually like to do at work. At the same time, the task and activities that were hindering became evident and revealed to them the risks in their work.

In the fourth step, the participants were challenged to formulate meaningful, personal changes in their work situations. Subsequently and in line with the principles of the JD-R model, the participants were asked to discuss which things they could change in their work to increase social job resources, increase challenging job demands, increase structural job resources, or to decrease hindering job demands. The self-formulated job crafting activities that resulted from the participants' analysis and the discussion was then saved in a personal job crafting action plan. The job crafting plan contained participants' job crafting goals and the actions they would take to increase their resources and challenges or to decrease their hindering job demands. The participants subsequently carried out their action plan on the job in the subsequent 4 weeks. This strategy is equivalent to the principles of proactive goal-setting (Parker et al., 2010). The 4-week period was chosen for both theoretical and practical reasons. In line with the principles of proactive goal-setting (Parker et al., 2010), the goals that employees set themselves should be geared to the short term. A period of 4 weeks is short enough to be focused and at the same time long enough for the participants to encounter an adequate number of situations in which they can craft their job by adapting their job demands and/or resources.

Finally, the second session assessed the extent to which the self-initiated job changes had been successful over a period of 4 weeks (step 5). These individual assessments of the success of one's own activities provided the opportunity in step 6 to see the benefits of successful activities and the obstacles to job crafting. By explicitly stating which job crafting activities resulted in which benefits, and which organizational or personal limitations they faced in job crafting, the participants shared what they had learned. The participants also discussed what they would need in the future to maintain the fit between their personal competencies, preferences, and the job. At the end of the intervention, the participants had learned what they could do to change elements of their jobs and their relationships with others in order to increase their job resources and challenges at work. Figure 2 presents the design of the job crafting intervention. It is important to note that in this study, it is the actual changes that employees made themselves (or in collaboration with colleagues) that determined the ultimate effectiveness of the intervention.

Measures

The questionnaires were identical for all participants and all three measurements (T1, T2, and T3).

Job Crafting was measured using the Job Crafting scale developed by Tims et al. (2012), which consists of four subscales, namely: increasing social job resources, increasing structural job resources, increasing challenging job demands, and decreasing hindering job demands. Increasing social job resources, structural job resources, and challenging job demands was assessed with five items. Decreasing hindering job demands was assessed with six items. Examples are: "I ask my supervisor to coach me." (increasing social job resources), "I try to develop my capabilities." (increasing structural job resources), "When an interesting project comes along, I offer myself proactively as project co-worker." (increasing challenging job demands), and "I make sure that my work is mentally less intense." (decreasing hindering job demands). Participants could respond to each of the job crafting items using a five-point scale, ranging from (1) never to (5) very often.

Job demands. Workload was measured using a three-item Dutch version (Furda, 1995) of Karasek's (1985) job content instrument. A sample item is: "Do you have to work quickly?" All items were scored on a five-point scale where the scale ranged from (1) never to (5) always. *Emotional demands* were assed with a shortened three-item version (emotional demands) of the scale developed by Van Veldhoven and Meijman (1994). An example of an emotional demands item is, "Does your work put you in emotional situations?" All items were scored on a five-point scale where the scale ranged from (1) never to (5) always.

Job resources. Performance feedback was assessed with a three-item scale developed by Bakker, Demerouti, Taris, Schaufeli, and Schreurs (2003). A sample item is: "I receive sufficient information about my work objectives". Participants had to score the items on a five-point scale, ranging from (1) never to (5) always. *Opportunities for professional development* were assessed with three items from Bakker et al.'s (2003) scale. An item is "My work offers me the possibility to learn new things". All items were scored on a five-point scale where the scale ranged from (1) totally disagree to (5) totally agree.

Personal resources. Resilience was measured using a shortened five-item version of the scale developed by Block and

Kremen (1996) An example is: "I enjoy dealing with new and unusual situations". Participants had to score the items on a four point scale, from (1) does not apply at all to (4) applies very strongly. *Self-efficacy* was measured using a shortened four-item version of the scale developed by Schwarzer and Jerusalem (1995). An item is: "I am confident that I could deal effectively with unexpected events". Participants had to score the items on a four-point scale, from (1) absolutely wrong to (4) absolutely right.

Work engagement was measured with the nine-item Utrecht Work Engagement Scale (UWES; Schaufeli, Bakker, & Salanova, 2006). The instrument consists of three subscales to assess vigour, dedication, and absorption. Here is an example for each subscale: "At work, I am bursting with energy" (vigour), "I am enthusiastic about my job" (dedication), and "I am immersed in my work" (absorption). Participants could respond to these items using a 7-point frequency scale, ranging from (0) never to (6) always.

In-role performance was measured using the in-role performance scale by Williams and Anderson (1991), which consists of seven items of which an example is: "Adequately completes assigned duties". Participants had to score the items on a five-point scale ranging from (1) totally disagree to (5) totally agree.

Results

Descriptive statistics

The reliabilities and correlations between all study variables at the three measurement points are displayed in Table 1.

Hypotheses testing

Our central prediction is that the job crafting intervention will influence employees' job crafting behaviour (H1), by which employees will influence their workload (H2a), emotional demands (H2b), feedback (H3a), opportunities for professional development (H3b), resilience (H4a), self-efficacy (H4b), work engagement (H5a), and in-role performance (H5b). To test these hypotheses, we conducted repeated measures (RM) multivariate analyses of covariance (MANCOVA) with time (T1–T2–T3) as a within-person factor and group (intervention group vs. control group) as a between-person factor, and age as the covariate. Age was used as a covariate because analyses revealed a significant correlation between age and the outcome variables. When the multivariate analysis revealed a significant effect, we proceeded with the univariate analyses. In addition, we hypothesized a mediated relation between the job crafting intervention and job demands through job crafting behaviour (H2c), job resources through job crafting behaviour (H3c), personal resources through job crafting behaviour (H4c), work engagement through job crafting behaviour (H5c), and in-role performance through job crafting behaviour (H5d). These hypotheses were tested with Hayes' PROCESS macro (Hayes, 2013) for SPSS. The means and standard deviations of the study variables for the intervention group and control group at T1, T2, and T3 are presented in Table 2.

Job crafting

In hypothesis 1, we proposed that participants' levels of job crafting behaviour would significantly increase after the job crafting intervention compared to their level prior to the intervention and compared to the control group. The four job crafting components served simultaneously as dependent variables, and age as covariate in the 3 (Time) x 2 (Group) multivariate analysis of covariance (MANCOVA) for RM. The results of the RM MANCOVA revealed a significant time x group interaction effect F (4, 67) = 12.77; $p < .05$, showing that the changes in job crafting scores were different in the two groups.

We proceeded with the univariate analysis of covariance (RM ANCOVA) to examine the changes from time 1 to time 2 and from time 2 to time 3 for the four job crafting components. The results of the univariate analyses showed a significant increase of increasing challenging job demands (F (1, 72) = 4.82; $p < .05$) and decreasing hindering job demands (F (1, 72) = 4.75; $p < .05$) within the intervention group from time 1 to time 2. No significant change was found for the control group on these variables. The results of the analyses showed no changes from time 1 to time 2 on increasing social and structural job resources for both the intervention and the control group. From time 2 to time 3, a significant decline of decreasing hindering job demands (F (1, 68) = 4.28; $p < .05$), and a significant increase of increasing structural job resources (F (1, 68) = 7.82; $p < .01$) was found within the intervention group while no significant changes on these job crafting behaviours were found for the control group. Job crafting in the form of increasing challenging job demands decreased within the control group from time 2 to time 3 (F (1, 68) = 6.15, $p < .05$) while no changes were found for the intervention group (F (1, 68) = 0.08, ns). These findings partially confirm hypothesis 1.

Job demands

In hypothesis 2a and 2b, we proposed that participants' levels of workload, and emotional demands would significantly decrease after the job crafting intervention compared to their level prior to the intervention and compared to the control group. The two job demands served as the three dependent variables, and age was used as a covariate in the 3 (Time) x 2 (Group) multivariate analysis of covariance (MANCOVA) for RM. The results of the RM MANCOVA showed that the changes in job demands scores were similar in the two groups (F (3, 67) = 6.98; ns). Participants' job demands did neither decrease from time 1 to time 2, nor from time 2 to time 3. These findings reject hypothesis 2a–2c.

Job resources

In hypothesis 3a and 3b, we proposed that participants' levels of feedback and opportunities for professional development would significantly increase after the job crafting intervention compared to their level prior to the intervention and compared to the control group. The two job resources served simultaneously as dependent variables, and age as covariate in the 3 (Time) x 2 (Group) RM MANCOVA. The results of the analysis revealed a significant time x group interaction effect

Table 1. Means, standard deviations, correlations, and Cronbach's alpha coefficients (on the diagonal) of the research variables on time 1, time 2, and time 3.

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
1. Age	45.25	10.05																																						
2. Gender	1.17	.38	.12																																					
3. Social job resources T1	2.53	.48	.03	−.01	(.52)																																			
4. Structural job resources T1	3.71	.53	.03	.09	.33**	(.79)																																		
5. Challenging job demands T1	3.01	.63	.03	.10	.23*	.37**	(.74)																																	
6. Hindering job demands T1	2.29	.49	−.03	.16	.09	.05	.25*	(.73)																																
7. Workload T1	3.38	1.00	−.13	.04	−.10	−.07	.23*	.31**	(.91)																															
8. Emotional job demands T1	2.50	.68	.11	.08	.08	−.02	.28*	.14	.53**	(.79)																														
9. Feedback T1	3.01	.81	.25*	−.08	.19	.28*	−.10	−.12	−.38**	−.29*	(.83)																													
10. Development T1	3.37	.91	.05	−.07	.32**	.53**	.06	.06	−.29*	−.23	.62**	(.92)																												
11. Resilience T1	2.79	.63	.03	.20	.19	.45**	.55**	.09	.11	.13	.18	.21	(.85)																											
12. Self-efficacy T1	3.34	.42	.32**	−.02	−.08	.15	.35**	−.07	−.02	.07	.24*	.26*	.28*	(.77)																										
13. Work engagement T1	4.78	1.00	−.07	.07	.18	.58**	.21	.07	−.05	−.18	.51**	.50**	.35**	.09	(.93)																										
14. In-role performance T1	4.24	.50	.04	.09	.04	.56**	.26*	.03	−.04	−.10	.28*	.30**	.29*	.21	.52**	(.84)																									
15. Social job resources T2	2.56	.55	.07	−.08	.73**	.31**	.39**	.13	−.18	.06	.22	.36**	.26*	−.02	.23*	.05	(.71)																								
16. Structural job resources T2	3.69	.52	.08	.16	.29*	.71**	.44**	.14	.10	.08	.07	.31**	.38**	.14	.42**	.37**	.30**	(.81)																							
17. Challenging job demands T2	3.14	.62	−.04	.09	.17	.44**	.77**	.16	.04	.12	.09	.29*	.47**	.34**	.37**	.36**	.39**	.51**	(.74)																						
18. Hindering job demands T2	2.34	.50	−.07	−.08	.14	.11	.30**	.70**	.15	.11	.03	.18	.03	.02	.07	.10	.27*	.18	.26*	(.76)																				
19. Workload T2	3.22	1.00	−.25*	−.10	.03	.03	.20	.19	.71**	.53**	−.35**	−.19	.14	−.03	−.07	.06	−.12	.15	.11	.20	(.88)																			
20. Emotional job demands T2	2.36	.66	.03	.00	.17	.01	.18	.10	.32**	.75**	−.17	−.12	.08	.00	−.10	−.11	.13	.05	.17	.19	.46**	(.73)																		
21. Feedback T2	3.00	.67	.23*	.06	.17	.33**	.04	−.11	−.09	−.08	.61**	.47**	.29*	.15	.44**	.23	.22	.23*	.21	−.08	−.18	−.16	(.83)																	
22. Development T2	3.33	.81	−.09	−.17	.36**	.50**	.03	−.04	−.17	−.24*	.46**	.74**	.19	.10	.41**	.21	.38**	.39**	.21	.10	−.10	−.22	.56**	(.90)																
23. Resilience T2	2.83	.57	.05	.26*	.12	.37**	.53**	.03	.02	.09	.10	.15	.79**	.22	.28*	.24*	.31**	.44**	.59**	−.01	.09	.06	.24*	.09	(.83)															
24. Self-efficacy T2	3.31	.39	.22	.08	−.03	.25*	.29*	−.02	.06	.11	−.02	.22	.33**	.49**	.18	.25*	.06	.33**	.40**	.05	.09	.12	.08	.11	.31**	(.78)														
25. Work engagement T2	4.76	1.08	−.07	.03	.20	.53**	.10	.08	−.05	−.20	.47**	.51**	.25*	.01	.84**	.39**	.29*	.46**	.30**	.05	−.13	−.21	.45**	.52**	.25*	.17	(.95)													
26. In-role performance T2	4.16	.48	.08	.06	.10	.48**	.33**	−.11	.09	−.09	.10	.16	.17	.20	.45**	.67**	.11	.44**	.33**	.00	−.01	−.14	.22	.27*	.12	.25*	.38**	(.84)												
27. Social job resources T3	2.54	.55	−.28*	−.12	.07	.03	.08	.06	.04	.05	−.10	.09	.01	−.03	−.18	.03	.16	.09	.16	.28*	.17	.14	−.13	.06	−.01	.07	−.13	.03	(.63)											
28. Structural job resources T3	3.81	.51	.03	−.03	.33**	.29*	.05	−.03	−.11	−.08	.01	.19	.03	.00	.08	.14	.31**	.51**	.16	.04	.03	−.02	.16	.32**	.13	.01	.12	.24*	.26*	(.73)										
29. Challenging job demands T3	3.04	.58	.07	−.11	.26*	.11	.31**	.00	−.09	.01	.15	.18	.24*	.27*	−.06	.09	.31**	.36**	.32**	.06	.02	.02	.14	.21	.24*	.13	−.10	−.01	.24*	.56**	(.69)									
30. Hindering job demands T3	2.20	.57	.02	.14	−.10	−.20	.02	.21	.23*	.14	−.25*	−.12	.09	.05	−.24*	−.13	−.18	−.06	−.11	−.03	.14	−.04	−.08	−.16	.00	.02	−.25*	.00	.19	.11	.13	(.76)								
31. Workload T3	3.32	.89	−.14	−.07	−.07	.05	.05	.16	.34**	.37**	−.23	−.13	−.10	−.14	−.07	.09	−.02	.06	.08	.09	.33**	.44**	−.17	−.18	−.03	−.08	−.11	.03	−.04	.04	−.05	.26*	(.87)							
32. Emotional job demands T3	2.51	.71	.04	.19	.04	.18	.16	.21	.31**	.37**	−.12	−.13	.20	.04	−.02	.23	−.09	.24*	.13	.13	.26*	.36**	−.08	−.17	.08	.08	−.11	.17	.09	.13	.09	.26*	.44**	(.74)						
33. Feedback T3	3.15	.84	−.01	−.05	.15	.14	−.03	−.11	−.12	−.20	.39**	.23	−.04	−.05	.22	.10	.18	.17	.06	.06	−.07	−.04	.39**	.30*	.00	−.03	.35**	.18	.27*	.22	.12	−.27*	−.20	−.09	(.87)					
34. Development T3	3.68	.80	−.11	−.20	.15	.12	−.02	−.04	−.12	−.28*	.15	.28*	.02	.01	.13	.07	.28*	.15	.12	.01	.04	−.27*	.27*	.44**	.10	.09	.25*	.11	.32**	.40**	.28*	−.06	−.13	−.19	.49**	(.89)				
35. Resilience T3	2.90	.56	.02	.13	.14	.18	.18	.02	−.04	.08	−.02	.17	.37**	.21	−.02	−.04	.07	.35**	.23	−.08	−.03	.14	.09	.11	.38**	.23	−.12	−.09	.11	.32**	.52**	.10	−.12	.14	.00	.02	(.82)			
36. Self-efficacy T3	3.50	.43	−.04	−.14	.01	.17	.09	−.20	−.13	−.10	.05	.10	.04	.13	.05	.02	.13	.15	.29*	−.16	−.09	.15	.08	.17	.08	.17	−.01	.11	−.07	.18	.19	−.31**	.04	−.05	.21	.14	.43**	(.84)		
37. Work engagement T3	4.77	.96	−.02	−.09	.14	.29*	−.12	−.07	−.15	−.35**	.35**	.28*	−.10	.04	.43**	.27*	.05	.21	−.05	−.04	−.15	−.30*	.31**	.47**	−.20	.00	.45**	.38**	.12	.40**	.06	−.13	−.22	−.03	.42**	.47**	−.04	.12	(.91)	
38. In-role performance T3	4.53	.79	.15	−.03	.17	.11	−.19	−.31**	−.30*	−.32**	.35**	.11	−.05	−.17	.23	.04	.06	.08	−.05	−.13	−.22	−.07	.31**	.10	−.07	−.09	.22	.07	.06	.39**	.13	−.18	−.20	−.06	.42**	.16	.04	.20	.42**	(.84)

M = mean; *SD* = standard deviation. * $p < .05$, ** $p < .01$

Table 2. Overview of means and standard deviations at T1, T2, and T3 for the intervention group and control group.

	Intervention group (N = 45)								Control group (N = 30; T3 = 26)						
	T1		T2			T3			T1		T2		T3		
	M	*(SD)*	*M*	*(SD)*	(η2)	*M*	*(SD)*	(η2)	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	(η2)
Social job resources	2.55	(0.52)	2.62	(0.54)		2.66	(0.49)		2.50	(0.38)	2.47	(0.56)	2.33	(0.58)	
Structural job resources	3.72	(0.55)	3.69	(0.55)		3.90bc	(0.52)	0.09/0.16	3.71	(0.54)	3.69	(0.55)	3.66	(0.49)	
Challenging job demands	2.97	(0.68)	3.12a	(0.65)	0.08	3.14	(0.61)		3.07	(0.56)	3.17	(0.63)	2.85b	(0.49)	0.06
Hindering job demands	2.24	(0.47)	2.36a	(0.50)	0.06	2.12	(0.56)		2.37	(0.52)	2.32	(0.50)	2.33	(0.59)	
Workload	3.16	(1.00)	3.25	(0.96)		3.22	(0.90)		3.17	(0.97)	3.18	(1.02)	3.14	(0.87)	
Emotional job demands	2.39	(0.58)	2.33	(0.59)		2.47	(0.58)		2.54	(0.78)	2.39	(0.73)	2.59	(0.65)	
Feedback	3.14	(0.75)	2.99	(0.58)		3.36b	(0.86)	0.09	2.81	(0.88)	3.00	(0.79)	2.79	(0.67)	
Development	3.40	(0.93)	3.35	(0.77)		3.82bc	(0.77)	0.11/0.10	3.32	(0.90)	3.31	(0.90)	3.44	(0.89)	
Resilience	2.86	(0.61)	2.91	(0.56)		2.97	(0.58)		2.69	(0.66)	2.72	(0.61)	2.78	(0.52)	
Self-efficacy	3.33	(0.40)	3.29	(0.41)		3.54b	(0.45)	0.12	3.37	(0.43)	3.35	(0.34)	3.44	(0.39)	
Work engagement	4.76	(0.99)	4.75	(1.07)		4.82	(0.88)		4.81	(1.07)	4.77	(1.06)	4.69	(1.08)	
In-role performance	4.25	(0.55)	4.10a	(0.49)	0.07	4.74bc	(0.70)	0.19/0.11	4.21	(0.42)	4.27	(0.40)	4.15	(0.82)	

Significant change from: a T1–T2, b T2–T3, c T1–T3

(F (3, 67) = 9.47; p < .05), showing that the changes in job resources scores were different in the two groups. We proceeded with RM ANCOVAs for the three separate job resources.

The results of the RM ANCOVAs showed no significant changes from time 1 to time 2, for feedback (F (1, 72) = 1.14; ns), and opportunities for professional development (F (1, 72) = 3.36; ns) within the intervention group and the control group. However, there were several significant changes after 1 year. From time 2 to time 3, the results for feedback revealed a significant increase (F (1, 68) = 8.83; p < .01) from time 2 to time 3 within the intervention group, but not within the control group (F (1, 68) = 0.71; ns). Further, the results of the RM ANCOVA showed a significant increase of opportunities for professional development (F (1, 68) = 8.83; p < .01) from time 2 to time 3 within the intervention group, but not within the control group (F (1, 68) = 0.71; ns). These findings show that feedback and opportunities for development increased over the 1-year time period. Hence, these results confirm H3a and H3b.

Hypothesis 3c proposed a mediated relationship between the job crafting intervention and job resources through (increase in) job crafting behaviour. To test this hypothesis, we used Hayes' PROCESS macro (Hayes, 2013) Model 4. PROCESS Model 4 allows testing of the mediating relationship via calculation of 1000 bias-corrected bootstrap 95% confidence intervals for an indirect effect. The bootstrap is a statistical resampling method that estimates the parameters of a model and their standard errors strictly from the sample (Preacher & Hayes, 2008). Bootstrapping computes more accurate confidence intervals of indirect effects ($x \rightarrow m \rightarrow y$) than the more commonly used methods, such as the causal steps strategy (Baron & Kenny, 1986), as it does not assume that the sampling distribution is normal (Preacher & Hayes, 2008). This is especially relevant for indirect effects, as their distributions are skewed away from zero (Shrout & Bolger, 2002).

We tested the indirect effect of the job crafting intervention on job resources (feedback) through (increase in) job crafting behaviour. The results of the analysis showed that this indirect effect was not significant (ns) for all four job crafting dimensions. Increasing social job resources (b = .28, SE = .18, ns), increasing structural job resources (b = .25, SE = .19, ns), increasing challenging job demands (b = .06, SE = .17, ns), and decreasing hindering job demands (b = –.32, SE = 0.17, ns). We repeated this analysis for opportunities for professional development. The results of the bootstrap analysis showed that this indirect effect was significant for increasing social job resources (b = .41, SE = .17, p < .05), increasing structural job resources (b = .58, SE = 0.18, p < .05), increasing challenging job demands (b = .33, SE = .16, p < .05). The analyses did not reveal significant outcomes for decreasing hindering job demands. Taken together, these findings partially confirm H3c. The outcomes (b, SE, and CI) of the mediation analyses are presented in Table 3.

Personal resources

Besides the hypotheses regarding job resources, we hypothesized that participants' levels of resilience (H4a) and self-efficacy (H4b) would significantly increase after the job crafting intervention compared to their level prior to the intervention and compared to the control group. We conducted a similar 3 (Time) x 2 (Group) RM MANCOVA with resilience and self-efficacy as the

Table 3. Overview of estimates, standard errors, and confidence interval

	Self-efficacy			Development			Feedback			Performance		
Mediator	*b*	*SE*	*CI*	*b*	*SE*	*CI*	*b*	*SE*	*CI*	*b*	*SE*	*CI*
Increasing social job resources	−0,0919	0,0989	−,0331,1375	0,4075	0,1737	−,3497 −,0148	0,2892	0,1802	−,1535 −,0091	−0,0728	0,1705	−,0597,1291
Increasing structural job resources	0,1365	0,1034	−,1347,0099	0,5808	0,1765	−,3459 −,0115	0,2499	0,1909	−,1202,0081	0,5052	0,1690	−,3089,−0052
Increasing challenging job demands	0,1295	0,091	−,1281,0073	0,3293	0,1628	−,1248 -,0015	0,0583	0,1703	−,0898,0379	0,0679	0,1583	−,1408,0992
Decreasing hindering job demands	−0,2284	0,0879	−,0706,0043	−0,0301	0,1673	−,1063,0520	−0,3174	0,1658	−,1209,0037	−0,1689	0,1569	−,1805,0174

dependent variables. The results of the RM MANCOVA showed that the two groups differed significantly (F (2, 67) = 7.95; p < .05), revealing a main effect of time. The results of the univariate analyses revealed no significant changes in resilience and self-efficacy from time 1 to time 2 for both the intervention and control group. From time 2 to time 3 the univariate analysis revealed no significant changes in resilience for both the intervention (F (1, 68) = 0.46, ns) and control group (F (1, 68) = 0.55, ns). However, the univariate analyses revealed that self-efficacy increased significantly from time 2 to time 3 within the intervention group (F (1, 68) = 9.50; p < .01), while no effects were found within the control group (F (1, 68) = 2.59, ns). These findings reject hypothesis 4a but offer support for hypothesis 4b.

Hypothesis 4c proposed a mediated relationship between the job crafting intervention and personal resources through (increase in) job crafting behaviour. Because the outcomes of the RM MANCOVA analyses revealed no effect on resilience we will only examine mediation for self-efficacy. To test this hypothesis, again we examined the indirect effects using Hayes' PROCESS macro (Hayes, 2013) Model 4 with calculation of 1000 bias-corrected bootstrap 95% confidence intervals. We tested the indirect effect of the job crafting intervention on personal resources (self-efficacy) through (increase in) job crafting behaviour. The results of the analysis showed no indirect effect for increasing social job resources (b = −.09, SE = .10, ns), increasing structural job resources (b = 0.14, SE = .10, ns), increasing challenging job demands (b = 0.13, SE = .09, ns), and decreasing hindering job demands (b = −0.23, SE = 0.09, ns). Hence, we reject H4c.

Work engagement and in-role performance

Regarding work engagement (H5a) and in-role performance (H5b), we hypothesized that participants' levels would significantly increase after the job crafting intervention compared to their level prior to the intervention and compared to the control group. To test hypotheses H5a and H5b, we conducted a 3 (Time) x 2 (Group) RM MANCOVA in which work engagement and in-role performance served simultaneously as dependent variables. The results of the analysis revealed a significant time x group interaction effect (F (2, 67) = 14.00, p < .01), showing that the changes in work engagement and in-role performance scores were different in the two groups. We proceeded with the RM ANCOVA for work engagement and in-role performance separately. The RM ANCOVA revealed no changes for work engagement from time 1 to time 2 and from time 2 to time 3 for both the intervention group (T1–T2: F (1, 72) = 0.01, ns; T2–T3: F (1, 68) = 0.23, ns) and the control group (T1–T2: F (1, 72) = 0.01, ns; T2–T3: F (1, 68) = 0.40, ns). These findings reject hypothesis 5a and 5c.

The RM ANCOVA revealed a significant decrease of in-role performance within the intervention group from time 1 to time 2 (F (1, 72) = 7.12; p < .01). Further, the results showed a strong increase of in-role performance for the intervention group from time 2 to time 3 (F (1, 68) = 28.67 p < .001). Because in-role performance decreased from time 1 to time 2 and increased from time 2 to time 3 within the intervention group, we also examined the changes from time 1 to time 3. The RM ANCOVA revealed a significant increase of in-role performance from time 1 to time 3 (F (1, 68) = 14.30, p < .001) within the intervention group. No significant change of in-role performance was found within the control group (From T1–T2: F (1, 72) = 0.59; ns; T2–T3: F (1, 68) = 0.86; ns; T1–T3: F (1, 68) = 0.40, ns). Because of these findings we partially confirm H5b.

Hypothesis 5d proposed a mediated relationship between the job crafting intervention and in-role performance through (increase in) job crafting behaviour. To test this hypothesis, again we examined the indirect effects using Hayes' PROCESS macro (Hayes, 2013) Model 4 with calculation of 1000 bias-corrected bootstrap 95% confidence intervals. We tested the indirect effect of the job crafting intervention on in-role performance through (increase in) job crafting behaviour. The results of the bootstrap analysis showed that this indirect effect was significant for increasing structural job resources (b = .50, SE = .17, p < .05). The analyses did not reveal significant outcomes for increasing social job resources (b = −.07, SE = .17, ns), increasing challenging job demands (b = 0.07, SE = 0.16, ns), and decreasing hindering job demands (b = −.17, SE = .16, ns). Taken together, these findings partially confirm H5d.

Discussion

The present study among teachers shows that a job crafting intervention can foster job crafting behaviours. This is the first study that has examined a job crafting intervention aimed at optimizing job demands, job and personal resources, and fostering work engagement and performance. The design of this study is based on theoretical assumptions derived from JD-R theory (Bakker & Demerouti, 2014; Demerouti & Bakker, 2011), which states that by job crafting employees can optimize their job demands and personal and job resources which contribute to work engagement and performance.

Theoretical contributions

The present study contributes to the literature in four ways. First, as far as we know, this is the first job crafting intervention study that has revealed a significant increase of job crafting behaviour compared to a control group. The results not only showed significant effects 1 week after the intervention was completed, but also 1 year later. Our results are in contrast with the outcomes of a job crafting intervention study by Van den Heuvel et al. (2012) who did not find significant effects on job crafting behaviour after their intervention, although the intervention did improve the work environment in other ways.

The analysis of the four separate job crafting components showed that decreasing hindering job demands and increasing challenging job demands significantly changed at time 2. In contrast with the second measurement, the third measurement revealed a significant increase of increasing structural job resources and a decrease of decreasing hindering job demands. During the job crafting intervention, the participants made an overview of their job tasks, the time they spent on their tasks, and possible risk factors in their work. By doing this, they may have become more aware of their hindering job demands and therefore actively tried to

decrease them. At time 3, the participants focused less on decreasing hindering job demands. The study outcomes revealed support for this assumption; the means of decreasing hindering job demands showed that the participants put less effort into reducing hindering job demands at time 3 than before the job crafting intervention. The participants may have succeeded in taking away their hindrances or did not succeed and stopped trying. Participants, who were unable to implement their intended job crafting actions, may require special attention. A negative job crafting experience may feel as failure and in turn may contribute to cynicism.

A study by Van Wingerden et al. (2013) revealed that it is not easy for teachers to decrease their hindering job demands. In their study, 34 teachers tried to decrease their hindering job demands, and 12 of them (35%) indicated that they did not manage to succeed. The outcomes of this study revealed that although participants try to adapt their job demands through job crafting, their level of job demands did not decrease after the intervention. The only job crafting component on which we found no significant effect on both time 2 and time 3 is increasing social resources. The participants work in direct contact with students most of their time, not in direct contact with colleagues. Therefore, the participants may have felt that they did not have opportunities to increase their social resources at work. As a consequence, they may have focused on increasing structural job resources instead of increasing social resources. The higher means of increasing structural resources compared to the means of increasing social job resources for both the intervention group and control group support this assumption.

As a second important finding, this study revealed significant effects of a job crafting intervention on the resources feedback, opportunities for professional development, and self-efficacy. As far as we know, this study is the first showing an impact of a job crafting intervention on these specific resources. In line with JD-R theory (Bakker & Demerouti, 2014), our study indicates that stimulating employees' job crafting behaviours can result in an increase of both their job and personal resources. Moreover, these outcomes were found 1 year after the job crafting intervention. This delayed effect is also known as a sleeper effect (Frese & Zapf, 1988). A sleeper effect occurs when interventions do not have an immediate effect but need (incubation) time to reveal their results (Frese & Zapf, 1988; Nesselroade, 1991). Our outcomes are in line with other intervention studies that also reported sleeper effects (Bry, Conboy, & Bisgay, 1986; Bry & Krinsley, 1992; Krinsley, 1991). This suggests that it takes time before increased job crafting behaviour will be effective.

Third, the analyses showed significant effects of a job crafting intervention on in-role performance 1 year after the intervention. Participants' in-role performance did not increase at time two, which may be explained by their job crafting behaviour. Through job crafting, participants increased their challenging job demands at time 2. Employees who increase their challenging job demands, for example, by starting new activities, may learn and apply new skills and do not feel they are performing right from the start. In addition, by starting new activities employees may need to invest extra time. This will not only affect the time available for their other tasks but consequently may also influence employees' perception of their in-role performance. Fourth, the mediation analyses revealed that job crafting is the mechanism through which the intervention contributed to improved levels of opportunities for professional development and in-role performance.

Limitations and avenues for future research

We want to mention several limitations of our study. The first limitation is that all participants worked for the same educational organization. Socially desirable behaviour and group pressure are possible risks when participants work in the same team. Moreover, participants from different organizations may be less influenced by other participants and may feel more comfortable showing their vulnerability because of the anonymity. A second limitation involves the homogeneity of our sample; the sample consisted of teachers only. This restricts the generalizability of our findings. Future studies should try to replicate our study among employees of several other occupational groups.

A third limitation of this study concerns participants' job demands, resilience, and work engagement. We did not find a significant effect for these variables at time 2 or time 3. In line with the findings by Van Wingerden et al. (2013), this study revealed that teachers did not succeed in decreasing their job demands. In addition, the personal resource resilience did not increase. The job crafting intervention is not merely focused on enhancing personal resources, which may explain why resilience did not increase. Work engagement also did not change at time 2—this may be explained by the significant increase of decreasing hindering job demands. Earlier research had revealed that decreasing hindering job demands is unrelated (Tims et al., 2012) or negatively related to work engagement (Petrou et al., 2012). However, although decreasing hindering job demands diminished significantly at time 3, there was no increase in work engagement at time 3.

A fourth limitation concerns the measurement of in-role performance. In this study, we only measured participants' self-ratings of in-role performance. Future studies may also pay attention to other ratings of students, colleagues, or supervisors. These other ratings may offer a more objective view of the improvement in terms of observable behaviour or realization of work-related goals. Since the main hypotheses regarding job crafting, personal, and job resources and performance were confirmed, it would be interesting and relevant to replicate this first longitudinal job crafting study with other occupational groups and a heterogeneous sample. Finally, in this study we only collected quantitative data. Additional qualitative data may have helped us in interpreting and explaining the results. Earlier studies (Van Wingerden et al., 2013; Van Wingerden et al., 2016) that did collect qualitative data, gave insights that contributed to the explanation of the intervention effects. It is recommended for future studies to include a qualitative part as well since this may be valuable in explaining the study results.

Practical implications and conclusion

A practical implication of the outcomes of this study is that organizations should be aware of the opportunities that job crafting interventions can provide. The rapid technological and economic changes that are characteristic of our society today force organizations and their employees to adapt to continuous change. Organizations may use interventions to foster employee job crafting behaviours. Such interventions will improve employees' job and personal resources, and may consequently have a positive impact on organizational performance. In addition, this can help employees to cope with a continuously changing work environment. Senior management should acknowledge the importance of facilitating and stimulating a resourceful and challenging work environment.

The job crafting intervention showed that it is possible to stimulate employees' behaviour in relation to adapting job demands and resources. Senior management can actively support employees, for example, by giving more feedback at work (Wrzesniewski & Dutton, 2001). Because of the negative relation between decreasing hindering job demands and performance (Tims, Bakker, Derks, & Van Rhenen, 2013), management could actively try to stimulate employees to increase job resources and challenging job demands. More specifically, increasing structural resources seems to be the most effective job crafting strategy in relation to performance. Therefore, facilitating sufficient opportunities for professional development at work may be an advisable investment. In addition, organizations can also use surveys or questionnaires to find out whether employees experience enough opportunities to craft their jobs. Based on the outcomes of the surveys, individualized reports could be made including personalized feedback and suggestions on how employees themselves could optimize their resources and job demands at work. Senior management should introduce job crafting as a structural conversation topic of staff meetings. By doing this, job crafting will become a subject that is included in the daily routine.

In sum, we conclude that introducing job crafting interventions in educational organizations may offer opportunities to enhance employees well-being and performance. The job crafting intervention may be a promising tool to facilitate a resourceful work environment which enables employees to achieve their personal and organizational goals. Although we found positive effects in this intervention study, we need to consider the presented results within the context of limitations regarding generalizability. Further research is needed to examine whether these positive effects will be found consistently among other sectors and in other occupational groups.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

Bakker, A. B., & Bal, M. P. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology*, *83*, 189–206. doi:10.1348/096317909X402596

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, *22*, 309–328.

Bakker, A. B., & Demerouti, E. (2014). Job demands-resources theory. In C. Cooper & P. Chen (Eds.), *Wellbeing: A complete reference guide* (pp. 37–64). Chichester: Wiley-Blackwell.

Bakker, A. B., Demerouti, E., Taris, T. W., Schaufeli, W. B., & Schreurs, P. J. G. (2003). A multi-group analysis of the job demands-resources model in four home care organizations. *International Journal of Stress Management*, *10*, 16–38. doi:10.1037/1072-5245.10.1.16

Bakker, A. B., Rodriguez-Munoz, A., & Sanz-Vergel, A. I. (2016). Modelling of job crafting behaviours: Implications for work engagement. *Human Relations*, *69*, 169–189.

Bakker, A. B., Tims, M., & Derks, D. (2012). Proactive personality and job performance: The role of job crafting and work engagement. *Human Relations*, *65*, 1359–1378. doi:10.1177/0018726712453471

Bakker, A. B., & Xanthopoulou, D. (2013). Creativity and charisma among female leaders: The role of resources and work engagement. *The International Journal of Human Resource Management*, *24*, 2760–2779. doi:10.1080/09585192.2012.751438

Bandura, A. (1996). *Social learning theory*. Englewood Clivs, NJ: Prentice-Hall.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182. doi:10.1037/0022-3514.51.6.1173

Berg, J. M., Dutton, J. E., & Wrzesniewski, A. (2007). *What is job crafting and why does it matter*. Center for Positive Organizational Scholarship, Ross School of Business, University of Michigan. Retrieved June 15, 2015, from, http://positiveorgs.bus.umich.edu/wp-content/uploads/What-is-Job-Crafting-and-Why-Does-it-Matter1.pdf

Berg, J. M., Dutton, J. E., Wrzesniewski, A., & Baker, W. E. (2008). *Job crafting exercise* (pp. 1–8). Center for Positive Organizational Scholarship, Ross School of Business, University of Michigan, Theory-to-Practice Briefing. Retrieved June 15, 2015, from http://positiveorgs.bus.umich.edu/wp-content/uploads/Job-Crafting-Exercise-Teaching-Note-Aug-101.pdf

Block, J., & Kremen, A. M. (1996). IQ and ego-resiliency: Conceptual and empirical connections and separateness. *Journal of Personality and Social Psychology*, *70*, 349–361. doi:10.1037/0022-3514.70.2.349

Bry, B. H., Conboy, C., & Bisgay, K. (1986). Decreasing adolescent drug use and school failure: Long-term effects of targeted family-problem solving training. *Child & Family Behavior Therapy*, *8*, 43–60. doi:10.1300/J019v08n01_03

Bry, B. H., & Krinsley, K. E. (1992). Booster sessions and long-term effects of behavioral family therapy on adolescent substance use and school performance. *Journal of Behavior Therapy and Experimental Psychiatry*, *23*, 183–189. doi:10.1016/0005-7916(92)90035-H

Colbert, J. A., Brown, R. S., Choi, S., & Thomas, S. (2008). An investigation of the impacts of teacher-driven professional development on pedagogy and student learning. *Teacher Education Quarterly*, *35*, 135–154.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Boston, MA: Houghton Mifflin.

Demerouti, E., & Bakker, A. B. (2011). The job demands–resources model: Challenges for future research. *South African Journal of Industrial Psychology*, *37*, 1–9.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, *86*, 499–512. doi:10.1037/0021-9010.86.3.499

Frese, M., & Zapf, D. (1988). Methodological issues in the study of work stress: Objective versus subjective measurement of work stress and the question of longitudinal studies. In C. L. Cooper & R. Payne (Eds.), *Causes, coping, and consequences of stress at work* (pp. 375–411). Chichester: Wiley.

Furda, J. (1995). *Werk, persoon en welzijn: Een toets van het JD-C model*. [Work, personality, and wellbeing: A test of the JD-C model]. Unpublished doctoral dissertation, Utrecht University, The Netherlands.

Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology*, *43*, 495–513. doi:10.1016/j.jsp.2005.11.001

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York, NY: Guilford Press.

Hobfoll, S. E., Johnson, R. J., Ennis, N., & Jackson, A. P. (2003). Resource loss, resource gain, and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, *84*, 632–643. doi:10.1037/0022-3514.84.3.632

Jettinghof, K., Van Dijk, M., & Scheeren, J. (2014). *Aanpak van werkdruk in het primair onderwijs* [Reducing job demands in Dutch primary education]. The Hague: CAOP Research.

Karasek, R. (1985). *Job content instrument: Questionnaire and user's guide, revision 1.1*. Los Angeles, CA: University of Southern California.

Koppes, L. L. J., De Vroome, E. M. M., Mol, M. E. M., Janssen, B. J. M., & Bossche, S. N. J. V. D. (2011). *Nationale enquête Arbeidsomstandigheden 2010* [Netherlands Working Conditions Survey 2010]. Hoofddorp: TNO.

Krinsley, K. E. (1991). Behavioral family therapy for adolescent school problems: School performance effects and generalization to substance use. Doctoral dissertation, Rutgers University, The United States.

Kulik, C. T., Oldham, G. R., & Hackman, J. R. (1987). Work design as an approach to person-environment fit. Journal of vocational behavior, 31 (3), 278–296.

Leana, C., Appelbaum, E., & Shevchuk, I. (2009). Work process and quality of care in early childhood education: The role of job crafting. *Academy of Management Journal*, *52*, 1169–1192. doi:10.5465/AMJ.2009.47084651

LePine, J. A., & Van Dyne, L. (1998). Predicting voice behavior in work groups. *Journal of Applied Psychology*, *83*, 853–868.

Luthans, F. (2002). The need for and meaning of positive organizational behavior. *Journal of Organizational Behavior*, *23*, 695–706. doi:10.1002/(ISSN)1099-1379

Luthans, F. Y., Youssef, C. M., & Avolio, B. J. (2007). *Psychology capital: Developing the human competitive edge*. New York: Oxford University Press.

Lyons, P. (2008). The crafting of jobs and individual differences. *Journal of Business Psychology*, *23*, 25–36. doi:10.1007/s10869-008-9080-2

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, *56*, 227–238. doi:10.1037/0003-066X.56.3.227

Motowidlo, S. J., & Van Scotter, J. R. (1994). Evidence that task performance should be distinguished from contextual performance. *Journal of Applied Psychology*, *79*, 475–480. doi:10.1037/0021-9010.79.4.475

Nesselroade, J. R. (1991). Interindividual differences in intraindividual change. In L. M. Collins & J. L. Horn (Eds.), *Best methods for the analysis change: Recent advances, unanswered questions, future directions* (pp. 92–105). Washington, DC: American Psychological Association.

Nicholson, N. (1984). A theory of work role transitions. *Administrative Science Quarterly*, *29*, 172–191.

Parker, S. K., Bindl, U. K., & Strauss, K. (2010). In making things happen: A model of proactive motivation. *Journal of Management*, *36*, 827–856. doi:10.1177/0149206310363732

Petrou, P., Demerouti, E., Peeters, M. C. W., Schaufeli, W. B., & Hetland, J. (2012). Crafting a job on a daily basis: Contextual correlates and the link to work engagement. *Journal of Organizational Behavior*, *33*, 1120–1141. doi:10.1002/job.1783

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879–891. doi:10.3758/BRM.40.3.879

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement*, *66*, 701–716. doi:10.1177/0013164405282471

Schaufeli, W. B., Salanova, M., González-romá, V., & Bakker, A. B. (2002). The measurement of burnout and engagement: A confirmatory factor analytic approach. *Journal of Happiness Studies*, *3*, 71–92. doi:10.1023/A:1015630930326

Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35–37). Windsor: NFER-NELSON.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods 7*, 422–445.

Staw, B. M., & Boettger, R. D. (1990). Task revision: A neglected form of work performance. *Academy of Management Journal*, *33*, 534–559.

Tims, M., Bakker, A. B., & Derks, D. (2012). Development and validation of the job crafting scale. *Journal of Vocational Behavior*, *80*, 173–186. doi:10.1016/j.jvb.2011.05.009

Tims, M., Bakker, A. B., & Derks, D. (2013). The impact of job crafting on job demands, job resources, and well-being. *Journal of Occupational Health Psychology*, *18*, 230–240. doi:10.1037/a0032141

Tims, M., Bakker, A. B., Derks, D., & Van Rhenen, W. (2013). Job crafting at the team and individual level: Implications for work engagement and performance. *Group & Organization Management*, *38*, 427–454. doi:10.1177/1059601113492421

Tuckey, M. R., Bakker, A. B., & Dollard, M. F. (2012). Empowering leaders optimize working conditions for engagement: A multilevel study. *Journal of Occupational Health Psychology*, *17*, 15–27. doi:10.1037/a0025942

Van den Heuvel, M., Demerouti, E., & Peeters, M. C. W. (2012). Succesvol job craften door middel van een groepstraining [Succesful job crafting through group training]. In J. De Jonge, M. C. W. Peeters, S. Sjollema, & H. De Zeeuw (Eds.), *Scherp in Werk: Vijf routes naar optimale inzetbaarheid* (pp. 7–20). Assen: Van Gorcum.

Van Grinsven, V., Elphick, E., & Van der Woud, L. (2012). *Rapportage 'Werkdruk in het primair en voortgezet onderwijs* [Job demands in primary and secondary education]. Utrecht: DUO Onderwijsonderzoek.

Van Veldhoven, M. J. P. M., & Meijman, T. F. (1994). *Het meten van psychosociale arbeidsbelasting met een vragenlijst: De vragenlijst beleving en beoordeling van de arbeid* [The measurement of psychosocial strain at work: The questionnaire experience and evaluation of work]. Amsterdam: NIA.

Van Wingerden, J., Bakker, A. B. & Derks, D. (2016). The impact of personal resources and job crafting interventions on work engagement and performance. *Human Resource Management*. Advance online publication. doi:10.1002/hrm.21758

Van Wingerden, J., Derks, D., Bakker, A. B., & Dorenbosch, L. (2013). Job crafting in het speciaal onderwijs: Een kwalitatieve analyse [Job crafting in schools for special education: A qualitative analysis]. *Gedrag & Organisatie*, *26*, 85–103.

Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, *17*, 601–617. doi:10.1177/014920639101700305

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, *26*, 179–201.