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# Effectiveness of job crafting interventions: a meta-analysis and utility analysis

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## ABSTRACT

Job crafting (JC) is a form of bottom-up job design with a high potential for increasing work engagement and performance. For this reason, researchers have proposed interventions to stimulate JC in organizations. The purpose of this paper was twofold: (1) to meta-analyse the effectiveness of interventions on increasing JC behaviours, work engagement, and job performance; and (2) to estimate the economic value of JC interventions, applying utility analysis. The systematic search identified 14 eligible studies. Random-effects meta-analyses revealed statistically significant results on overall JC ( $g = 0.26$ ; 95%CI [0.11, 0.40]), seeking challenges ( $g = 0.19$ ; 95%CI [0.05, 0.33]), and reducing demands ( $g = 0.44$ ; 95%CI [0.19, 0.69]), on work engagement ( $g = 0.31$ ; 95%CI [0.14, 0.50]), and on contextual performance ( $g = 0.39$ ; 95%CI [0.01, 0.78]). Moderator analyses found that interventions in which participants formed plans that included both organizational and personal objectives had moderate effectiveness in boosting work engagement; only healthcare employees reported gains in task performance. Any effects of enhancing JC behaviours on performance were fully explained by increases in work engagement. Utility analysis indicated substantial benefits regarding dollar value increases in output, the percentage increase in output, and reduced labour costs for healthcare professionals.

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## KEYWORDS

Job crafting; intervention; meta-analysis; work engagement; job performance; utility analysis

Job design, as a solution for increasing employee performance and well-being, represents one of the central areas of study in work and organizational psychology (Parker, Morgeson, & Johns, 2017). However, classical top-down approaches of job design, such as simplification, standardization, or enrichment, led to mixed results in terms of performance improvement and sometimes even to counter-productive behaviours (Oldham & Fried, 2016). Given these consequences, modern bottom-up approaches have considered ways in which employees can themselves design their jobs (Hornung, Rousseau, Glaser, Angerer, & Weigl, 2010). For example, Daniels, Gedikli, Watson, Semkina, and Vaughn (2017) conducted a systematic review of interventions that aim to increase the well-being of workers through job design and concluded that training employees to improve their jobs by themselves is a promising method for enhancing well-being and performance. Two of the interventions cited by Daniels et al. (2017) were based on teaching employees how to craft their jobs. Job crafting (JC) represents the changes made proactively by employees regarding their job demands and job resources (Tims, Bakker, & Derks, 2012; Wrzesniewski & Dutton, 2001). JC has been meta-analytically shown to be associated with positive outcomes, including work engagement and job performance (Rudolph, Katz, Lavigne, & Zacher, 2017). These contributions encouraged the use of JC, as a set of proactive behaviours, in performance enhancement and human resources development.

Given these potential benefits of JC, the number of studies reporting on the development and effectiveness of various JC interventions has been steadily rising, from just one controlled study in 2015 to eleven until 2018. However, to our knowledge,

no quantitative review of the results of JC interventions has been published up to date. Since the literature in this field has increased, this paper expands on the extant systematic reviews (e.g., Daniels et al., 2017) by quantitatively evaluating the effectiveness of JC interventions. Therefore, the first objective of the current paper is to provide a systematization of the available data and conduct a meta-analysis regarding the efficacy of JC interventions. Secondly, we point to several authors (e.g., Boudreau & Ramstad, 2002) who have described the apparent incapacity of work and organizational psychology to provide actionable data for strategic HRM decisions. They have also pointed to utility analysis as one of the avenues through which such integration between psychological data and HR decisions could be achieved. In following this call, the second objective of this paper was to conduct a utility analysis to estimate the economic value of JC interventions for organizations. By addressing these objectives, we expect to encourage researchers and practitioners to invest further effort in developing evidence-based interventions related to JC.

This paper contributes to the job design literature in several ways. Firstly, by conducting a meta-analysis, we reached a global estimate of the effect size of JC interventions, leading to a more objective evaluation of their effectiveness. Secondly, we examined the impact of potential moderators and provided valuable information on how interventions should be carried out, and on what groups of employees such interventions might have the greatest impact. Finally, the results of the utility analysis highlight the economic value of JC interventions, allowing us to understand if and when they lead to a return on investment that exceeds the short-term costs of their implementation.

### JC, work engagement, and performance

JC is a form of bottom-up job design in which employees change, based on their own initiative, the content or relational boundaries of their jobs, even without explicit authorization from the employer (Wrzesniewski & Dutton, 2001). They do so by increasing resources and challenging demands and by reducing hindering demands (Tims et al., 2012). The level of JC can vary from one employee to another (Tims et al., 2012) and even from one day to another for the same employee (Petrouti, Demerouti, Peeters, Schaufeli, & Hetland, 2012). There is also a difference in how JC goals are being set: employees may decide the goals by themselves, a case in which they set individual objectives (e.g., Demerouti, Xanthopoulou, Petrouti, & Karagkounis, 2017; Kooij, van Woerkom, Wilkenloh, Dorenbosch, & Denissen, 2017), or they may establish JC plans by also including defined organizational objectives, hence are setting combined objectives (e.g., Gordon et al., 2018; Holman & Axtell, 2016).

Even though JC has been traditionally defined based on two competing perspectives (Demerouti, 2014; Le Blanc, Demerouti, & Bakker, 2017), it was measured in research only based on one of these. The first perspective, developed by the American scholars Wrzesniewski and Dutton (2001), described JC as a series of proactive changes in physical, cognitive, and relational job characteristics. According to them, job crafters change the job's task boundaries, the way they think about tasks and the interactions they have with colleagues, supervisors, or clients. The second perspective, which could be referred to as the Dutch approach, relates JC to the Job Demands-Resources model (JD-R; Bakker & Demerouti, 2007), and defines JC as a series of proactive behaviours aimed at seeking resources, seeking challenges, and reducing demands (Tims et al., 2012). The distinction between the two perspectives is that the definition of Tims et al. (2012) is centered explicitly on job characteristics and, unlike the definition of Wrzesniewski and Dutton (2001), that also includes the cognitive processes and internal states related to task redefinition, is focused only on external behaviours (Demerouti, 2014). This distinction postulates different measurement models, and it is important enough to warrant different measurement instruments for the two perspectives. The JD-R perspective has provided a reliable operationalization: Tims et al. (2012) developed the Job Crafting Scale, that includes four independent JC dimensions (i.e., increasing structural job resources, increasing social job resources, increasing challenging job demands, and decreasing hindering job demands). This instrument was later adopted and sometimes adapted by other researchers (e.g., Petrouti et al., 2012). The Wrzesniewski and Dutton (2001) perspective has, unfortunately, not provided a measurement instrument for JC (Demerouti, 2014). Given this situation, JC was conceptualized and measured in all empirical studies from the perspective of the JD-R model. Accordingly, the JD-R model also served as the basis for JC interventions. Hence, our first question targets the effectiveness of JC interventions for an increase in overall JC and its components, as defined by the JD-R model. If interventions have an effect on JC, then this may indicate that JC behaviours learned in a training situation, later transfer to the job (Ford, Baldwin, & Prasad, 2018). More broadly, this may suggest that it is possible to transfer proactive behaviours from the context of learning into daily work activities.

Research question 1: *Are JC interventions effective in enhancing overall JC and its components (i.e., seeking resources, seeking challenges, and reducing demands)?*

Work engagement, 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), is an important outcome because it is associated with the ultimate criterion of job performance (Bakker & Bal, 2010; Bakker, Demerouti, & Ten Brummelhuis, 2012; Christian, Garza, & Slaughter, 2011; Halbesleben & Wheeler, 2008). Since the basis of JC interventions is the JD-R model (see Bakker & Demerouti, 2007, 2014), we follow up on one of the model's predictions, namely that employees who craft their jobs will have more job resources (Tims, Bakker, & Derks, 2015a) and increasing resources will lead to a higher level of work engagement (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Bakker, Van Veldhoven, & Xanthopoulou, 2010). Also, job demands amplify the impact of resources on engagement (Hakanen, Bakker, & Demerouti, 2005); therefore, increasing challenges should also lead to a higher level of work engagement. In other words, the acquisition of new resources and challenges through JC will lead to engagement (Petrouti et al., 2012). This prediction was empirically supported in Rudolph et al. (2017) meta-analysis, but only on correlational data, while our aim is to seek support from studies with stronger designs for causal inference. Hence, the second research question of this meta-analysis investigates the effectiveness of JC interventions in increasing work engagement.

Research question 2: *Are JC interventions effective in enhancing work engagement?*

The positive relationship between JC and job performance was highlighted in qualitative interview studies (Berg, Wrzesniewski, & Dutton, 2010; Lyons, 2008), quantitative survey studies (Bakker, Tims, & Derks, 2012; Tims et al., 2012), and meta-analytically (Rudolph et al., 2017). On the one hand, according to the JD-R model (Bakker & Demerouti, 2014), JC leads to higher performance because it increases the work engagement of employees. This assumption regarding the mediating role of engagement is continuously supported by data (e.g., Tims et al., 2015a). On the other hand, by crafting their jobs, employees can create an optimal work environment, which contains the instrumental job resources that are needed in achieving work objectives (Tims et al., 2015a). Therefore, it is expected that they will have a higher level of performance also as a direct consequence of JC. Hence, increasing individual performance is arguably the goal of all JC interventions, all the targeted constructs (behaviours, engagement), ultimately leading to performance. JC interventions are generally aimed at increasing three types of performance: task, adaptive, and contextual. Therefore, the third objective of this meta-analysis is to investigate whether there is an increase in both overall and these three types of performance following JC interventions.

Research question 3: *Are JC interventions effective in enhancing overall job performance and its components (task, adaptive, and contextual)?*

### **Moderator variables for the effectiveness of JC interventions**

Some intervention programs may be more effective than others, and some groups of employees may benefit more than others – it is essential to identify those factors that are associated with the most significant impact on outcomes. In these regards, after reviewing the literature on JC interventions, we selected the type of objectives set in the intervention (i.e., individual vs. combined) and participants' occupations as presumed moderators.

#### **Objective of the intervention**

As previously mentioned, there is a major difference between JC interventions in how goals are set: they may be focused on individual or combined objectives. Some of the interventions in which the participants set individual objectives were based on proactive goal setting (see Parker, Bindl, & Strauss, 2010), and the process of generating future goals involved three steps: envisioning, planning, and proactive goal striving. During interventions, participants envisioned a future in which they had more job resources and a higher level of well-being, and they created an action plan to achieve that future. The plan involved specific JC behaviours, and employees strived to reach that future by crafting their jobs. This process was used in two interventions (Van Wingerden, Bakker, & Derks, 2017a, 2017b), with positive results on JC behaviours, work engagement, and job performance. In other interventions that also included only individual objectives, SMART (Specific, Measurable, Attainable, Results-oriented, and Time-bound) goals were used (Demerouti et al., 2017; Dubbelt, 2016; Kooij et al., 2017). These interventions had mixed results on JC behaviours, but they had positive results on increasing work engagement (Dubbelt, 2016).

Regarding those interventions that included combined objectives, some of them used personal crafting plans (e.g., Gordon et al., 2018; Van den Heuvel, Demerouti, & Peeters, 2015; Van Mersbergen, 2012). JC plans consisted in specific crafting actions formulated by the participants and scheduled for the next weeks after the completion of the intervention. Also, objectives set by the organization had been added to these plans (e.g., finding out what budget is available to pursue a course). These programs reported mixed results regarding the effect on JC behaviours and job performance, but positive results on increasing work engagement (Gordon et al., 2018; Van Mersbergen, 2012), contextual performance (Gordon et al., 2018), and adaptive performance (Van Mersbergen, 2012). In another intervention of this category, Holman and Axtell (2016) reported that they used the scenario planning method. Participants in the intervention discussed the advantages and disadvantages associated with three possible job design scenarios (i.e., aimed at maximizing well-being, aimed at maximizing performance, or aimed at optimizing both) and decided on adopting one of these strategies. This intervention led to an increase in supervisor-rated job performance.

Given these mixed findings, we investigated which goal setting methods are more effective in stimulating JC behaviours, engagement, and performance: those in which employees only set their JC goals for themselves or those in which the goals are combined (set both by the employees and the company)? Therefore, our fourth research question is:

Research question 4: *Does the effectiveness of JC interventions differ as a function of the manner in which the objectives are set?*

#### **Occupation of participants**

The JD-R model (Bakker & Demerouti, 2014) argues that different occupations may rely on specific combinations of job resources and job demands. Therefore, distinct types of JC behaviours may be performed differently across occupational groups (Nielsen & Abildgaard, 2012). JC interventions have been tested on various samples, such as medical staff (e.g., Gordon et al., 2018), teachers (e.g., Dubbelt, 2016), or police employees (Van den Heuvel et al., 2015). The impact of JC interventions may differ from one occupation to another due to each job's specific characteristics, such as personalized feedback for healthcare professionals or opportunities for professional development in the case of teachers (Van Wingerden et al., 2017a). Also, a higher level of job autonomy may facilitate a change in resources and demands (Petrou et al., 2012). Indeed, nearly one-third of the variability in JC can be attributed to the occupational context (Dierdorff & Aguinis, 2018). Therefore, we checked whether interventions have a differential impact on employees from specific professional areas.

Research question 5: *Does the effectiveness of JC interventions differ between distinct occupations?*

#### **JC and performance: testing the indirect effect of work engagement**

Since the JD-R model predicts that employees who craft their jobs will have higher levels of work engagement (Bakker & Demerouti, 2007; Hakanen et al., 2005; Petrou et al., 2012), and work engagement will lead to job performance (Bakker & Bal, 2010; Bakker et al., 2012), it is expected that JC interventions will increase employee job performance by increasing their work engagement. Previous correlational data offered support for the mediated relationship between JC behaviours and task performance via work engagement (Bakker et al., 2012), findings that were also replicated on teams (Tims, Bakker, Derks, & Van Rhenen, 2013). Also, existing meta-analytical results support the relationship between JC and both work engagement and job performance (Rudolph et al., 2017). If the JD-R model is supported by our data, then the results of this meta-analysis will identify that the increase in JC behaviours predicts the enhancement of work engagement, which in turn is associated with an increase in performance. This indirect effect illustrates the presumed mediational process that explains the way in which JC interventions produce changes at a practical level (employee performance). Hence, through our meta-analysis, we also aimed at addressing the following research question:

Research question 6: *Is the increase in JC behaviours indirectly associated with an increase in employee performance through the elevation of work engagement?*

#### **Utility analysis of JC interventions**

Utility analysis, i.e., the assessment of the economic impact of human resources practices by applying mathematical formulas



(Barrick, Day, Lord, & Alexander, 1991; Roth, Bobko, & Mabon, 2002), has three significant benefits. Firstly, this type of analysis allows human resources professionals to explain the value of their practices efficiently (Boudreau, 1991; Highhouse, 1996; Rauschenberger & Schmidt, 1987), including organizational interventions (e.g., Arthur, Kyte, Villado, Morgan, & Roop, 2011). Secondly, utility analysis procedures may help decision makers choose what HRM strategies to adopt (Cabrera & Raju, 2001), based on the expected financial return on their investment in these strategies. Thirdly, the data indicates that managers respond more positively to information provided by organizational psychology if it is presented in conjunction with its likely financial benefits (Macan & Foster, 2004). Therefore, we expect that the utility analysis of JC interventions will help decision makers to understand the monetary benefits of employee JC behaviours and lead to more rational and productive choices about stimulating those behaviours at work. In other words, utility analysis would increase the chance for the adoption of JC interventions as essential tools in the repertoire of HRM practices. Hence, we estimate the economic value of JC interventions for organizations, applying the principles and procedures of utility analysis to compute the dollar value increase in output, the percentage increase in output, and the reduced labour costs derived from JC interventions.

## Method

We followed the PRISMA framework (Moher, Liberati, Tetzlaff, & Altman, 2009; Shamseer et al., 2015) for conducting and reporting the systematic review and meta-analytical procedures.

### Eligibility criteria

In order to systematize study selection, we used the PICOS approach (the acronym stands for: **P**opulation; **I**ntervention; **C**omparison; **O**utcome; **S**tudy type). Each study was required to meet the following criteria to be included in the meta-analysis: (P) the samples to consist of employees; (I) the intervention program to be explicitly developed from the Job Crafting theoretical perspective; (C) the study to include a control group (i.e., waiting list, inactive or placebo comparison); (O) job crafting, work engagement and/or employee performance to be among the monitored outcomes; (S) the design to be experimental (between-group baseline equivalence attained through randomization) or quasi-experimental (with no statistical differences between groups at baseline). Moreover, the study had to include all the necessary information to compute effect sizes, or at least to be retrievable from other sources than the actual report. There were no restrictions regarding the form of the intervention (e.g., focused on individuals or groups) or its duration.

### Information sources

The search strategy relied on three information sources: (1) systematic search in electronic databases, (2) search in work and organizational psychology conferences' abstracts volumes, (3) and contacting the main authors of published JC interventions.

The systematic search was conducted through the EBSCOhost interface by interrogating the following exact databases: *Academic Search Complete*, *Business Source Complete*, *Education Research Complete*, *ERIC*, *MEDLINE*, *Professional Development Collection*, *Psychology and Behavioral Sciences Collection*, *PsycINFO*, *Vocational and Career Collection*. The abstracts volumes were screened for the conferences and meetings organized by the European Association of Work and Organizational Psychology, European Academy of Occupational Health Psychology, Society for Industrial and Organizational Psychology.

### Literature search

The database search was conducted without a lower time limit and until January 2018. The Boolean search was as follows: ("job crafting" OR "job craft" OR "job crafter" OR "seek challenges" OR "seeking challenges" OR "increase challenges" OR "increasing challenges" OR "decrease demands" OR "decreasing demands" OR "reduce demands" OR "reducing demands" OR JD-R OR "job demands-resources") AND (trial or experiment\* or quasi\* random or control) AND (intervention or treatment or program or strategy or training or workshop). All terms related to JC were searched only in abstracts (AB) while the other terms were searched throughout the manuscript. Meanwhile, using Wrzesniewski and Dutton (2001) work as a landmark for the emergence of job crafting, we tracked conference volumes from the end of 2018 back until 2001. Finally, authors have been contacted via e-mail, either to share unpublished data on JC interventions or to clarify or provide more data on published studies.

### Study selection

The process of study selection consisted in two steps: (1) screening the abstracts of identified records for presumed eligibility, and (2) screening the full texts of the records selected in the previous step. Abstracts' screening was performed by two independent reviewers, and both results were intersected. In this step, besides the abstracts commonly identified as eligible, we also kept each one's unique selections. Next, the full texts of the records selected after abstracts' screening were retrieved and checked for eligibility. This process involved checking if each study meets all the eligibility criteria and if reports all the necessary data for computing or estimating the effect size.

### Data items and data collection

Firstly, each study was screened to identify the necessary data for the computation of effect sizes (e.g., means and standard deviations for outcomes, as well as the sample sizes of the experimental and control groups). Secondly, the following characteristics and variables were extracted for each eligible study: identification data (i.e., authors and year of publication); (P) participants' occupation, geographical area of the participants; (I) intervention objective (i.e., individual or combined), intervention length (> 1 month or ≤ 1 month); (C) type of control group (i.e., inactive/no treatment, placebo control, waiting list), (O) outcomes (i.e., JC, work engagement, performance), (S) randomization of participants and times of measurement. Finally, the risk of bias assessment was performed (see the Risk of bias section).

The entire coding process was performed independently by 2 Ph.D. students. In order to calculate the degree of agreement between assessors, we computed the Cohen's Kappa statistic. Values ranging between 0.00–0.20 suggest slight agreement, 0.21–0.40 mean fair agreement, 0.41–0.60 represent moderate agreement, 0.61–0.80 substantial, and 0.81–1.00 almost perfect agreement (Gwet, 2012). In our case the results ranged between moderate ( $\kappa = 0.42$ ; for length of the intervention) to almost perfect agreement ( $\kappa = 0.83$ ; for control condition). Any case of differences was re-examined by a third reviewer, and afterward, as the standard practice requires, all three experts discussed the discrepancies until 100% agreement was reached.

### **Risk of bias**

Based on the Cochrane Collaboration tool (Higgins & Green, 2011), the risk of internal bias has been assessed by taking into consideration the following criteria: sequence generation and allocation concealment (selection bias), blinding of outcome assessor (detection bias), incomplete outcome data (attrition bias), selective outcome reporting (reporting bias), and other potential threats to internal validity. Each aspect has been evaluated for each study by assigning it either a "low risk" of bias, "high risk" of bias or "unclear risk" of bias. For each quality criteria, low risk of bias is attributed only when there is a clear description in the manuscript of the way that specific aspect was handled. For example, a low risk of bias for selection would be suggested by a clear description of the entire process of randomization. If the allocation was not randomly performed or participants switched places between groups after randomization, then the study is at high risk of bias. Finally, if the authors only mention (randomly) allocating participants but without detailing the procedure, then the study is labelled as unclear. The more criteria with low risk of bias a study meets, the higher is the quality (internal validity) of that study.

Risk of bias assessment was also performed by two independent experts. The extent of their agreement ranged between moderate ( $\kappa = 0.43$ ; for selective outcome reporting) to substantial ( $\kappa = 0.74$ ; for sequence generation). Again, any incongruence between reviewers was consensually settled after being checked by a third expert.

### **Summary measures and synthesis of results**

A random-effects meta-analysis was conducted using the Comprehensive Meta-Analysis 2.0 statistical package (Borenstein, Hedges, Higgins, & Rothstein, 2009). The efficacy of the interventions was expressed through Hedges's  $g$  effect size. This is a measure of standardized mean difference that is corrected for small sample bias (Hedges & Olkin, 1985). Its interpretation is the same as for Cohen's  $d$  (Cohen, 1988): effect sizes of .20 are considered small, effect sizes equal or larger than .50 are moderate, and estimates of .80 or higher are large. For the trials with pre-intervention and post-intervention measures, we computed the effects size based on the mean differences from pre- to post-intervention as the means within each group and the pre-intervention standard deviations ( $SDs$ ) as the  $SDs$  within each

group (Morris, 2008). If the  $SDs$  for each group were unavailable (only means were reported) but reported for the overall sample (common  $SD$ ), we used the pre-intervention common  $SD$  for computing the effect size. In one case (Van Wingerden, Derks, & Bakker, 2017), the trial compared four different groups (i.e., the JC intervention, a PsyCap intervention, a mixed intervention, and a control group). For each of these groups, the authors reported only the pre- and post-intervention means, while the  $SDs$  were reported for the entire sample. Since we were interested only in the comparison between the JC intervention and the control group, in order to compute the effect size for these differences, we used each group's mean and sample size, while for the  $SD$  we used the common one (computed for the entire sample of four groups). Thus, the effect sizes for this case are rather approximations than accurate estimates. Where both the means and  $SDs$  for each group were unavailable, but the correlations between the experimental condition (0 = no intervention, 1 = intervention) and outcomes at post-intervention were reported, we extracted and converted the correlation coefficients into standardized differences in means. Moreover, for each effect size and the average ones, we reported the standard error ( $SE$ ), lower limit and upper limit estimates (with a 95% confidence interval), and the  $p$ -value of the  $Z$  test (statistical test for the null hypothesis regarding the effect).

To get a grasp on the heterogeneity of the effects, we computed and reported the  $Q$  statistic (tests if there is significant unexplained variance in the true effect sizes),  $\tau^2$  (estimate of the between-study variance), and the  $I^2$  statistic (expresses the proportion of the observed variance which is true variance) (see Borenstein, Higgins, Hedges, & Rothstein, 2017; for details regarding heterogeneity in meta-analyses).

### **Additional analyses**

The hypothesized moderators were tested using subgroup analyses based on a mixed-effects model. This type of analysis is suitable for categorical moderators and employs a random-effects model within each subgroup, while between-subgroups differences are tested for significance based on a fixed-effects model. We also tested the moderated effect of the quality of the included studies (coded as a numerical variable, i.e., the total number of criteria for which a trial was ranked at low risk) on the mean effect size by using meta-regression analysis.

For the indirect relationship between the post-intervention effects on JC and the post-intervention effects on performance *via* the post-intervention effects on work engagement, we used regression analyses with the study as the unit of analysis. The indirect effect was tested based on 95% confidence intervals bootstrapped from 1000 samples.

We performed publication bias analyses for overall JC, work engagement, and overall performance. We analysed the funnel plots that display the effect sizes against their standard errors (Egger, Smith, Schneider, & Minder, 1997). In the case of biased literature, the funnel plot has an asymmetric shape, most often caused by the absence of studies with non-significant results. Moreover, we also computed Egger's regression intercept for the symmetry of the funnel plot. Also, we employed the Duval and Tweedie trim and fill procedure, which estimates the effect size after considering publication bias.

## Utility analysis

To estimate the financial value of the interventions, we used the procedures recommended by Cascio and Boudreau (2011). First, we analysed the dollar value increase in output of JC interventions. This value refers to an increase in revenue from improved performance (financial gains from the sale of the final output of the work, increased due to the adoption of JC). Based on Schmidt (2013), we considered the following estimation of dollar value for JC interventions:

$$\text{Dollar Value} = (T)(N)(SDy) - (N)(C) \quad (1)$$

where  $T$  is the number of years the program is continued,  $N$  is the number of employees included in the JC program,  $SDy$  is the standard deviation of job performance in dollar value, and  $C$  is the cost per employee for implementing the program. More than that, we conducted a break-even analysis (Cascio & Boudreau, 2011), in order to estimate the minimum cost per employee from which the intervention would no longer be cost effective (i.e., the increase in revenue from improved performance will be equal to or smaller than the cost of the intervention).

Secondly, we computed the percentage increase in output, which represents the average percentage increase in output produced under JC conditions as compared to the baseline in the control condition (the difference between the work output of the group that participated in the intervention and the work output of the control group, expressed as a percentage):

$$\text{Percentage Increase} = (d)(SDp) \quad (2)$$

where  $d$  is the effect size of the program on increasing job performance and  $SDp$  is the standard deviation of work output across employees as a percentage of mean output.

Finally, we computed the reduced labour costs (money saved because fewer employees must be paid to produce the same result). There are situations where the company does not need higher productivity, but a smaller number of employees to produce the same output – e.g., in situations where there is no market for additional output (Schmidt, 2013). We may estimate the reduced costs of labour based on the percentage increase in output (Schmidt, Hunter, Outerbridge, & Trattner, 1986), because when employees have a higher level of productivity as a result of an intervention, fewer employees are needed to produce the same output; in this case, companies save money by paying fewer employees for the same output.

$$\text{Reduced Labor Costs} = 100 - 100 / (1 + \text{Percentage Increase}) \quad (3)$$

## Results

### Selection and inclusion of studies

The initial search returned 114 records. After screening them, we identified 14 abstracts as being potentially eligible. Out of these, four articles were excluded for the following reasons: (1) lack of relevant information for the meta-analysis (i.e., O'Shea, Lynch, Molina, & Cullinane, 2016), (2) an article reported only a trial protocol (i.e., Slemp, Kern, & Baker, 2017), (3) a study

had no control group (i.e., Sakuraya, Shimazu, Imamura, Namba, & Kawakami, 2016), and (4) the study from a dissertation thesis (i.e., Van Mersbergen, 2012) was also reported in a later article (i.e., Gordon et al., 2018; Study 2) and we kept only the later reference. Moreover, we identified 6 other potential studies from I/O psychology conferences' programs. After contacting the authors, we received the needed information for 3 additional studies. Finally, 14 studies were included in the meta-analysis, out of which nine were journal articles (one article reported two studies), 3 were unpublished data from conference presentations, and 1 was a dissertation thesis (see Figure 1).

### Description of the sample of studies

A systematic overview of the studies' characteristics is displayed in Table 1. Studies have taken place in different countries. Most were carried out in The Netherlands ( $n = 9$ ; i.e., Dubbelt, 2016; Gordon et al., 2018; Kooij, Van Woerkom, & Kuijpers, 2018; Kooij et al., 2017; Van den Heuvel et al., 2015; Van Wingerden, Bakker, & Derks, 2016; Van Wingerden et al., 2017a, 2017b, 2017). One study was conducted in Belgium (Verelst, de Cooman, van Laar, & Meussen, 2018), one in Greece (Demerouti et al., 2017), one in Italy (Costantini, Demerouti, Ceschi, & Sartori, 2018), and another one in the United Kingdom (Holman & Axtell, 2016).

Regarding the composition of the samples, four studies included medical staff: medical specialists and nurses (Gordon et al., 2018; Study 1 & Study 2), healthcare professionals (Van Wingerden et al., 2016), or healthcare organization employees (Kooij et al., 2018). Four studies have been conducted in educational contexts: one on university teaching positions and support staff (Dubbelt, 2016), one on teachers working in primary education schools (Van Wingerden et al., 2017b), and two on teachers working in primary schools for special education (Van Wingerden et al., 2017a, 2017). The other six studies focused on employees from other areas: social services workers (Demerouti et al., 2017), call centre agents (Holman & Axtell, 2016), employees of a health insurance company (Kooij et al., 2017), employees of a police district (Van den Heuvel et al., 2015), social services and manufacturing workers (Costantini et al., 2018), and working mothers with various occupations (Verelst et al., 2018).

In most studies, JC was measured with the Petrou et al. (2012) scale, that includes seeking resources, seeking challenges, and reducing demands (Costantini et al., 2018; Demerouti et al., 2017; Dubbelt, 2016; Gordon et al., 2018; Van den Heuvel et al., 2015). In two studies, the full version of Job Crafting Scale (Tims et al., 2012) was used (Van Wingerden et al., 2017a, 2017). Van Wingerden et al. (2016, 2017b) used a partial version of the Job Crafting Scale (Tims et al., 2012), without the items focusing on decreasing hindering job demands. Kooij et al. (2017); (2018)) measured JC with a scale that they had developed, focusing on two components: crafting toward strengths and crafting toward interest. Finally, Verelst et al. (2018) used the Overarching Job Crafting Scale (Vanbelle, 2016). Holman and Axtell (2016) did not measure JC, but they measured participants' performance. Thus, we included only this outcome in the meta-analysis.

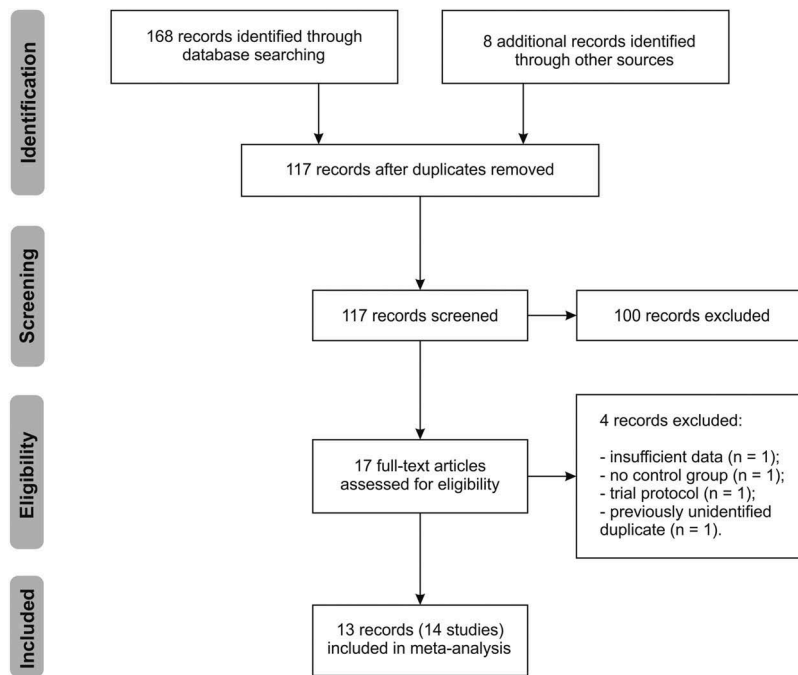


Figure 1. Flow diagram of the systematic literature search.

Apart from the trial reported by Van Wingerden et al. (2017a) in which a 1-year follow-up was employed, and Costantini et al.'s (2018) trial which had three repeated measures, all the other studies had only post-intervention assessments (i.e., outcome evaluation was conducted shortly after the intervention ended). Hence, the meta-analysis includes only post-intervention effects and not long-term effects.

Moreover, we consider worth highlighting that the study conducted by Demerouti et al. (2017) measured the efficacy of a JC intervention during a context of organizational change due to austerity measures. Thus, this study has a unique feature that might have impacted the delivery of the intervention and its effectiveness.

### Quality of the included studies

As summarized in Table 1 and displayed in Figure 2, we registered a high risk related to sequence generation and allocation concealment, as eleven out of thirteen studies were quasi-experimental or lacked a full randomized assignment. Only two studies were labelled with a low risk of bias (i.e., Holman & Axtell, 2016; Verelst et al., 2018). For example, Holman and Axtell (2016) used cluster randomization, which was done after the participants were recruited into the trial and after they filled-in the baseline measures. Detection bias had a low risk for more than half of the studies ( $n = 8$ ), and an unclear risk in the other four cases. Twelve studies were assessed with low risk regarding attrition bias and only one considered as unclear. Regarding reporting bias, ten studies were evaluated with low risk, two with high risk, and one unclear. For other potential threats, four out of ten studies have been rated as unclear, mainly due to issues regarding the sample (e.g., Gordon et al., 2018), and participants dropout (i.e., Dubbelt, 2016), while one was considered at high risk,

since some participants had the possibility of switching between experimental and control conditions (Kooij et al., 2017). In summary, eleven out of thirteen studies were assessed with a low risk of bias for at least half of the criteria taken into consideration. At the same time, selection bias was a concern in almost all cases (eleven out of thirteen). Hence, even though, overall, the risk of bias across studies seems low, we incline to consider it rather unclear.

### Intervention effectiveness on JC behaviours

The main meta-analytical results are presented in Table 2 and displayed in Figure 3. These revealed statistically significant effects on overall JC,  $g = 0.26$ ,  $p = .001$ , 95% CI [0.11, 0.40], and two of its subcomponents, namely seeking challenges,  $g = 0.19$ ,  $p = .009$ , 95% CI [0.05, 0.33], and reducing demands,  $g = 0.44$ ,  $p = .001$ , 95% CI [0.19, 0.69]. The effect on seeking resources was not statistically significant,  $g = 0.21$ ,  $p = .062$ , 95% CI [-0.01, 0.44]. The effects on overall JC and seeking challenges were quite homogeneous ( $ps$  for  $Qs > .050$ ,  $\tau^2$  and  $I^2$  close to or equal to 0.0, and confidence intervals stretched from very small effects to small ones). Contrariwise, seeking resources and reducing demands had inconsistent effects ( $ps$  for  $Qs < .050$ ,  $\tau^2 > 0.07$ ,  $I^2$  above 60%, and effects that transcended multiple categories of magnitudes – e.g., from null towards almost medium, for seeking resources).

### Intervention effectiveness on work engagement and performance

A significant and small increase was reported for work engagement ( $g = 0.31$ ,  $p = .001$ , 95% CI [0.14, 0.50];  $p$  for  $Q > .05$ ,  $\tau^2 = 0.02$ ;  $I^2 = 29.73\%$ ). For overall performance, which has been computed by taking into consideration all types of operationalizations, the



Table 1. Characteristics of the sample of studies included in the meta-analysis.

Study	Sample	Country	Intervention objective	Intervention length	Control condition	Measures	Outcomes	Operationalization of outcomes	Risk of bias		
									Low	Unclear	High
Costantini et al. (2018)	Employees working for different organizations (i.e. social services, manufacturing)	Italy	Individual	≤ 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement	Job crafting (Petrou et al., 2012) Work engagement (UWES – Italian version, Balducci, Fraccaroli, & Schaufeli, 2010)	1	4	1
Demerouti et al. (2017)	Employees of a municipality	Greece	Combined	≤ 1 month	No intervention	Pre-test, post-test	Job crafting Performance	Job crafting (Petrou et al., 2012) Adaptive performance (Individual Task Adaptivity Scale - Griffin et al., 2007)	3	1	2
Dubbelt (2016)	University staff	Netherlands	Individual	> 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement Performance	Job crafting (Petrou et al., 2012) Work engagement (UWES, Schaufeli et al., 2006) Task performance (Xanthopoulou et al., 2008)	3	1	2
Gordon et al. (2018); Study 1	Medical specialist	Netherlands	Combined	≤ 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement Performance	Job crafting (Petrou et al., 2012) Work engagement (UWES, Schaufeli et al., 2006) Adaptive performance (Metselaar, 1997) Task and contextual performance (Goodman & Syantec, 1999)	2	2	2
Gordon et al. (2018); Study 2	Nurses	Netherlands	Combined	≤ 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement Performance	Job crafting (Petrou et al., 2012) Work engagement (UWES, Schaufeli et al., 2006) Adaptive performance (Griffin et al., 2007) Task and contextual performance (Williams & Anderson, 1991)	2	2	2
Holman & Axtell (2016)	Civil Service employees (call center)	United Kingdom	Combined	> 1 month	No intervention (active)	Pre-test, post-test	Performance	Objective performance (specific) Job performance (Williams & Anderson, 1991)	6	0	0
Kooij et al. (2017)	Health insurance employees	Netherlands	Individual	≤ 1 month	No intervention	Pre-test, post-test	Job crafting	Job crafting (self developed scale)	3	0	3
Kooij et al. (2018)	Healthcare organization employees	Netherlands	Individual	> 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement	Job crafting (Kooij et al., 2017) Work engagement (UBES – Utrechtse Bevolgenheids Schaal developed by Schaufeli & Bakker, 2003)	3	0	3
Van den Heuvel et al. (2015)	Dutch police district employees	Netherlands	Combined	≤ 1 month	No intervention	Pre-test, post-test	Job crafting	Job crafting (Petrou et al., 2012)	3	1	2
Van Wingerden et al. (2016)	Healthcare professionals	Netherlands	Individual	> 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement Performance	Job crafting (Tims et al., 2012) Work engagement (UWES, Schaufeli et al., 2006) Performance (Williams & Anderson, 1991)	4	0	2
Van Wingerden et al. (2017a)	Teachers	Netherlands	Individual	> 1 month	No intervention	Pre-test, post-test, follow-up	Job crafting Work engagement Performance	Job crafting (Tims et al., 2012) Work engagement (UWES, Schaufeli et al., 2006) Performance (Williams & Anderson, 1991)	4	0	2
Van Wingerden et al. (2017b)	Teachers	Netherlands	Individual	> 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement	Job crafting (Tims et al., 2012) Work engagement (UWES, Schaufeli et al., 2006)	3	0	3
Van Wingerden et al. (2017)	Primary school teachers	Netherlands	Individual	> 1 month	No intervention	Pre-test, post-test	Job crafting Work engagement Performance	Job crafting (Tims et al., 2012) Work engagement (UWES, Schaufeli et al., 2006) Performance (Williams & Anderson, 1991)	3	0	3
Verelst et al. (2018)	Working mothers with various occupations	Belgium	Individual	< 1 month	No intervention	Pre-test, post-test, follow-up	Job crafting	Job crafting (Overarching Job Crafting Scale, Vanbelle, 2016)	4	2	0

Note: Risk of bias = risk of internal bias as resulted from the quality assessment (low / unclear / high = total criteria where the study was identified as being at low / unclear / high risk of bias).

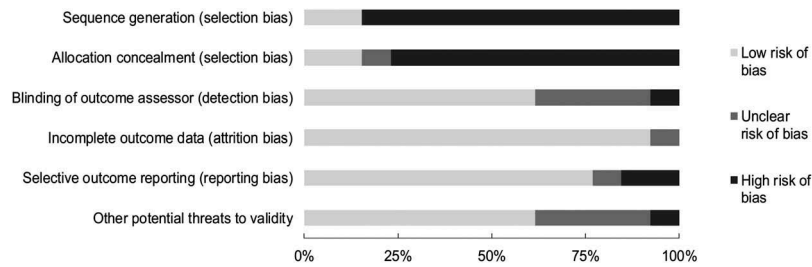


Figure 2. Risk of internal bias summary.

Table 2. Effectiveness of the interventions for all the outcomes.

Outcome	<i>k</i>	<i>n</i> (int)	<i>n</i> (con)	<i>g</i>	<i>SE</i>	95% CI	<i>p</i>	<i>Q</i> ( <i>df</i> )	$\tau^2$	$I^2$
Job crafting	13	522	558	0.26	0.07	0.11, 0.40	.001	16.92 <sub>(12)</sub>	0.02	29.07
Seeking resources	10	405	367	0.21	0.12	−0.01, 0.44	.062	21.65 <sub>(9)</sub> **	0.08	58.42
Seeking challenges	10	405	367	0.19	0.07	0.05, 0.33	.009	7.14 <sub>(9)</sub>	0.00	0.00
Reducing demands	8	321	313	0.44	0.13	0.19, 0.69	.001	16.60 <sub>(7)</sub> *	0.07	57.84
Work engagement	9	381	332	0.31	0.09	0.14, 0.50	.001	11.38 <sub>(8)</sub>	0.02	29.73
Performance	8	293	288	0.22	0.15	−0.07, 0.51	.133	19.90 <sub>(7)</sub> **	0.11	64.83
Task/in-role performance	6	240	207	0.19	0.17	−0.13, 0.52	.232	13.83 <sub>(5)</sub> *	0.10	63.83
Adaptive performance	3	110	139	0.35	0.24	−0.12, 0.81	.146	6.27 <sub>(2)</sub> *	0.11	68.12
Contextual performance	2	80	97	0.39	0.19	0.01, 0.78	.048	1.53 <sub>(1)</sub>	0.03	34.71

Notes: *k* = number of studies included in the analysis; *n* (int) = number of participants in the intervention group; *n* (con) = number of participants in the control group; *g* = average effect size; *SE* = standard error of the average effect size; 95% CI = minimum and maximum limits of the 95% confidence interval; *Q* = statistical test for the estimation of heterogeneity;  $\tau^2$  = between-study variance;  $I^2$  = proportion of observed effects variation that is due to true effects variation (%).

\**p* < .05; \*\**p* < .01

results do not show a statistically significant effect ( $g = 0.22$ ,  $p = .133$ , 95% CI [−0.07, 0.51]). Consequently, non-significant effects were revealed for task performance ( $g = 0.19$ ,  $p = .232$ , 95% CI [−0.13, 0.52]) and adaptive performance ( $g = 0.35$ ,  $p = .146$ , 95% CI [−0.12, 0.81]). However, statistically significant results were obtained for contextual performance,  $g = 0.39$ ,  $p = .048$ , 95% CI [0.01, 0.78]. Important to notice that both overall performance and the other two types with non-significant effects are highly heterogeneous ( $ps$  for  $Qs < .05$ ,  $\tau^2 > 0.10$ ,  $I^2$  above 60%, and effects cut across very small and negative indices towards positive medium or even large ones), but the samples of studies, especially for the subtypes of performance, are very small. Moreover, the contextual performance was averaged from only two studies, which makes this effect even less reliable.

### Moderator analyses

Heterogeneity analysis revealed elevated inconsistencies for the effects of the interventions on JC (especially two of its dimensions; i.e., seeking resources and reducing demands) and performance, both overall and the subtypes. However, from the latter category, adaptive performance ( $k = 3$ ) and contextual performance ( $k = 2$ ) were already based on very small samples of studies. Also, some inconsistencies seem to be present within the effects on work engagement. Hence, in the moderator analyses, we focused our attention especially on the variables that were heterogeneous and had enough studies for sub-group analyses (i.e., overall JC and its subdimensions; work engagement; overall performance and task performance). Moreover, we tested the moderator role of study quality on all three main outcomes (i.e., JC, work engagement, and performance), to inspect if the studies' effects sizes were biased by

their quality. As revealed in the literature (Hempel et al., 2011), studies with precarious internal validity tend to produce overestimated effect sizes.

### Objective of the intervention as moderator

We considered studies with "individual" objectives to be those where the goals of the crafting plan were set by participants in line with their work-related needs, and "combined" to be those where the crafting plans represent a combination between organizational goals and individual needs. As can be seen in Table 3, results indicated that the single significant difference was for work engagement. The mixed interventions ( $k = 2$ ;  $g = 0.63$ , 95% CI [0.33, 0.94],  $p < .001$ ;  $Q_{(1)} = 0.20$ ,  $p = .658$ ;  $\tau^2 = 0.00$ ;  $I^2 = 0.00$ ) were significantly superior than the individual ones ( $k = 7$ ;  $g = 0.20$ , 95% CI [0.03, 0.38],  $p = .019$ ;  $Q_{(6)} = 5.39$ ,  $p = .495$ ;  $\tau^2 = 0.00$ ;  $I^2 = 0.00$ ) in enhancing participants' engagement ( $Q_{\text{between } (1)} = 5.80$ ,  $p = .016$ ). There were no significant differences between the effects of individual and combined interventions regarding overall JC ( $Q_{\text{between } (1)} = 0.02$ ,  $p = .899$ ), or its components ( $Q_{\text{between } (1)} = 0.07$ ,  $p = .789$  for seeking resources;  $Q_{\text{between } (1)} = 0.08$ ,  $p = .775$  for seeking challenges;  $Q_{\text{between } (1)} = 0.80$ ,  $p = .372$  for decreasing demands). The type of objective did not have a significant effect on overall performance ( $Q_{\text{between } (1)} = 1.59$ ,  $p = .207$ ), or task performance ( $Q_{\text{between } (1)} = 3.03$ ,  $p = .082$ ).

### Participants' occupation as a moderator

The meta-analysed studies included education employees ( $k = 4$ ), healthcare professionals ( $k = 4$ ), and various other occupations ( $k = 6$ ). Even though the latter category includes almost half the studies, all the occupations grouped in it are

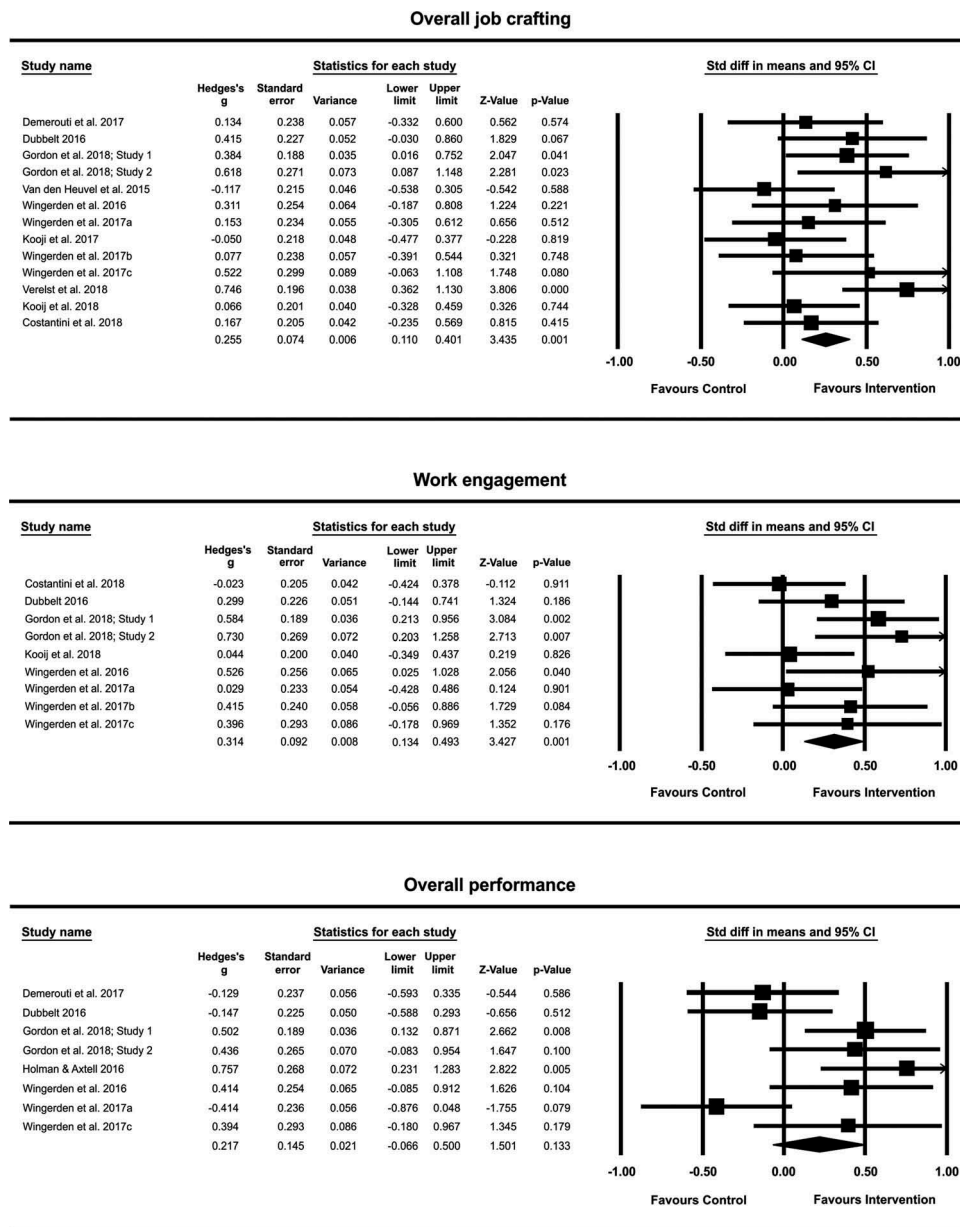


Figure 3. Standardized effect sizes and forest plots for the entire sample of studies for each of the three main outcomes.

unique. As reported in Table 4, the moderation effect was not significant on overall JC ( $Q_{\text{between } (2)} = 0.44$ ,  $p = .804$ ), and neither on any of the subcomponents ( $Q_{\text{between } (2)} = 2.92$ ,  $p = .232$  for seeking resources;  $Q_{\text{between } (2)} = 3.85$ ,  $p = .146$  for seeking challenges;  $Q_{\text{between } (2)} = 3.47$ ,  $p = .176$  for decreasing demands). Moreover, there was also a non-significant difference between occupational categories regarding the effect on work engagement ( $Q_{\text{between } (1)} = 0.81$ ,  $p = .369$ ).

The effectiveness on overall performance was not significantly different between the identified occupations ( $Q_{\text{between } (2)} = 4.57$ ,  $p = .102$ ). Instead, the effect on task performance was significantly moderated by occupation ( $Q_{\text{between } (1)} = 4.65$ ,  $p = .031$ ). In this case, there were only employees from education and healthcare. The efficacy of the interventions on healthcare employees produced significant and small to moderate increases in task performance ( $k = 3$ ;  $g = 0.47$ , 95% CI [0.21, 0.73],  $p < .001$ ;  $Q_{(2)} = 0.09$ ,  $p = .955$ ;

$\tau^2 = 0.00$ ;  $I^2 = 0.00$ ), while the effect on educational personnel was not significant and still inconsistent ( $k = 3$ ;  $g = -0.09$ , 95% CI [-0.52, 0.35],  $p = .698$ ;  $Q_{(2)} = 4.64$ ,  $p = .098$ ;  $\tau^2 = 0.08$ ;  $I^2 = 56.89$ ). It is important to mention that task performance was the only type of performance that was assessed for the latter category of employees.

#### Study quality as a moderator

We conducted separate meta-regressions with study quality (i.e. total number of internal bias criteria at which each study was at low risk; range: 1–6, median = 3) as predictor for each of the three major outcomes (overall JC, work engagement, and overall performance). The effect on overall JC was not statistically significant ( $b = 0.15$ ,  $SE = .22$ , 95% CI [-0.28, 0.57],  $p = .504$ ); the effect on work engagement was not statistically significant ( $b = 0.30$ ,  $SE = 0.23$ , 95% CI [-0.15, 0.76],  $p = .193$ ); also, the effect on overall performance was non-significant ( $b = 0.02$ ,  $SE = 0.07$ , 95% CI [-0.13, 0.16],

**Table 3.** Subgroup analyses investigating differences in effects based on the types of objectives that participants had to set.

Outcome	k	n(int)	sn(con)	g	SE	95% CI	p	Q(df)	$\tau^2$	I <sup>2</sup>	Q <sub>between</sub> (df)	p
<i>Overall job crafting</i>												
Individual	9	373	372	0.26	0.09	0.09, 0.44	.004	11.39 <sub>(8)</sub>	0.02	29.75	0.02 <sub>(1)</sub>	.899
Combined	4	149	186	0.24	0.15	-0.06, 0.55	.114	5.49 <sub>(3)</sub>	0.04	45.37		
<i>Seeking resources</i>												
Individual	6	256	181	0.19	0.01	0.01, 0.38	.049	2.38 <sub>(5)</sub>	0.00	0.00	0.07 <sub>(1)</sub>	.789
Combined	4	149	186	0.28	0.29	-0.29, 0.85	.345	19.29 <sub>(3)</sub> **	0.28	84.44		
<i>Seeking challenges</i>												
Individual	6	256	181	0.21	0.10	0.02, 0.40	.034	2.24 <sub>(5)</sub>	0.00	0.00	0.08 <sub>(1)</sub>	.775
Combined	4	149	186	0.16	0.14	-0.12, 0.44	.269	4.84 <sub>(3)</sub>	0.03	37.99		
<i>Reducing demands</i>												
Individual	4	117	86	0.57	0.22	0.15, 0.99	.008	9.42 <sub>(3)</sub> *	0.12	68.17	0.80 <sub>(1)</sub>	.372
Combined	4	149	186	0.33	0.16	0.02, 0.65	.040	6.09 <sub>(3)</sub>	0.05	50.78		
<i>Work engagement</i>												
Individual	7	301	235	0.20	0.09	0.03, 0.38	.019	5.39 <sub>(6)</sub>	0.00	0.00	5.80 <sub>(1)</sub>	.016
Combined	2	80	97	0.63	0.16	0.33, 0.94	< .001	0.20 <sub>(1)</sub>	0.00	0.00		
<i>Overall performance</i>												
Individual	4	160	110	0.04	0.21	-0.36, 0.45	.841	7.96 <sub>(3)</sub> *	0.10	62.30	1.59 <sub>(1)</sub>	.207
Combined	4	133	178	0.39	0.18	0.03, 0.75	.034	7.05 <sub>(3)</sub>	0.08	57.47		
<i>Task/in-role performance</i>												
Individual	4	160	110	0.04	0.21	-0.36, 0.45	.841	7.96 <sub>(3)</sub> *	0.10	62.30	3.03 <sub>(1)</sub>	.082
Combined	2	80	97	0.49	0.16	0.19, 0.79	.002	0.04 <sub>(1)</sub>	0.00	0.00		

Notes: k = number of studies included in the analysis; n (int) = number of participants in the intervention group; n (con) = number of participants in the control group; g = average effect size; SE = standard error of the average effect size; 95% CI = minimum and maximum limits of the 95% confidence interval; Q = statistical test for the estimation of heterogeneity;  $\tau^2$  = between-study variance; I<sup>2</sup> = proportion of observed effects variation that is due to true effects variation (%).

\*p < .05; \*\*p < .01

**Table 4.** Subgroup analyses investigating differences in effects based on participants' occupations.

Outcome	k	n(int)	n(con)	g	SE	95% CI	p	Q(df)	$\tau^2$	I <sup>2</sup>	Q <sub>between</sub> (df)	p
<i>Overall job crafting</i>												
Education	4	158	116	0.27	0.12	0.03, 0.52	.027	2.04 <sub>(3)</sub>	0.00	0.00	0.44 <sub>(2)</sub>	.804
Healthcare	4	168	175	0.31	0.11	0.10, 0.53	.005	2.93 <sub>(3)</sub>	0.00	0.00		
Other	5	196	167	0.18	0.16	-0.13, 0.50	.252	11.35 <sub>(4)</sub> *	0.08	64.75		
<i>Seeking resources</i>												
Education	4	158	116	0.18	0.12	-0.06, 0.42	.145	2.26 <sub>(3)</sub>	0.00	0.00	2.92 <sub>(2)</sub>	.232
Healthcare	3	123	121	0.55	0.35	-0.13, 1.23	.113	12.26 <sub>(2)</sub> **	0.29	83.69		
Other	3	114	130	-0.02	0.13	-0.26, 0.23	.899	1.45 <sub>(2)</sub>	0.00	0.00		
<i>Seeking challenges</i>												
Education	4	158	116	0.19	0.12	-0.05, 0.44	.112	1.52 <sub>(3)</sub>	0.00	0.00	3.85 <sub>(2)</sub>	.146
Healthcare	3	123	121	0.38	0.13	0.12, 0.64	.004	1.37 <sub>(2)</sub>	0.00	0.00		
Other	3	114	130	0.02	0.13	-0.23, 0.27	.878	0.38 <sub>(2)</sub>	0.00	0.00		
<i>Reducing demands</i>												
Education	3	117	86	0.73	0.26	0.21, 1.24	.006	6.02 <sub>(2)</sub> *	0.13	66.76	3.47 <sub>(2)</sub>	.176
Healthcare	2	80	97	0.49	0.16	0.19, 0.79	.001	0.08 <sub>(1)</sub>	0.00	0.00		
Other	3	114	130	0.18	0.17	-0.16, 0.52	.308	3.76 <sub>(2)</sub>	0.04	46.81		
<i>Work engagement†</i>												
Education	4	158	116	0.27	0.12	0.03, 0.51	.026	1.63 <sub>(3)</sub>	0.00	0.00	0.81 <sub>(1)</sub>	.369
Healthcare	4	223	216	0.45	0.16	0.14, 0.76	.004	5.76 <sub>(3)</sub>	0.05	47.89		
<i>Overall performance</i>												
Education	3	117	86	-0.09	0.22	-0.52, 0.35	.698	4.64 <sub>(2)</sub>	0.08	56.89	4.57 <sub>(2)</sub>	.102
Healthcare	3	123	121	0.47	0.13	0.21, 0.73	< .001	0.09 <sub>(2)</sub>	0.00	0.00		
Other	2	53	81	0.31	0.45	-0.57, 1.19	.491	6.14 <sub>(1)</sub> *	0.34	83.71		
<i>Task/in-role performance</i>												
Education	3	117	86	-0.09	0.22	-0.52, 0.35	.698	4.64 <sub>(2)</sub>	0.08	56.89	4.65 <sub>(1)</sub>	.031
Healthcare	3	123	121	0.47	0.13	0.21, 0.73	< .001	0.09 <sub>(2)</sub>	0.00	0.00		

Notes: k = number of studies included in the analysis; n (int) = number of participants in the intervention group; n (con) = number of participants in the control group; g = average effect size; SE = standard error of the average effect size; 95% CI = minimum and maximum limits of the 95% confidence interval; Q = statistical test for the estimation of heterogeneity;  $\tau^2$  = between-study variance; I<sup>2</sup> = proportion of observed effects variation that is due to true effects variation (%). †For work engagement, the "Other" category contained only one study, thus was not included in the comparison.

\*p < .05; \*\*p < .01

p = .815). Hence, study quality was not a statistically significant moderator for any of the outcomes. When interpreting these results, it is important to consider that the number of studies is small for each of the three outcomes (k range between 7 and 14).

### Indirect effect

The indirect effect was analysed on data extracted from only six studies (i.e., Dubbelt, 2016; Gordon et al., 2018, Study 1 & 2; Van



Wingerden et al., 2016, 2017, 2017a). These were the only ones to measure all three outcomes. As previously stated, we expected that the post-intervention effect on JC relates indirectly to the post-intervention effect on overall performance through the effect on work engagement (also measured in the post-test). First, the total effect of JC on performance was not statistically significant ( $b = 1.74$ ,  $SE = 0.87$ , 95% CI  $[-0.69, 4.15]$ ,  $p = .117$ ). Moreover, as can be seen in Figure 4, the relationship between JC and work engagement was partially significant ( $b = 1.11$ ,  $SE = 0.51$ , 95% CI  $[-0.30, 2.53]$ ,  $p = .094$ ), while work engagement significantly predicted performance ( $b = 1.50$ ,  $SE = .47$ , 95% CI  $[0.01, 3.01]$ ,  $p = .049$ ), and the direct effect of JC on performance was still non-significant ( $b = 0.06$ ,  $SE = 0.71$ , 95% CI  $[-2.19, 2.32]$ ,  $p = .934$ ). Finally, and most importantly, the indirect effect of JC on performance was statistically significant ( $b = 1.67$ ,  $SE = 0.96$ , 95% CI  $[0.16, 3.58]$ ,  $p = .020$ ). All the paths for the indirect relationship were tested based on two-tailed significance levels. Hence, the hypothesized indirect effect received support from the data.

### Publication bias

For JC effects ( $k = 13$ ), Egger's test was not significant (intercept = 0.85;  $p = .767$ , 95% CI  $[-5.28, 6.97]$ ). The Duval and Tweedie trim and fill procedure imputed no studies, and the funnel plot showed only a slight asymmetry (Figure 5). For work engagement ( $k = 9$ ), Egger's test was not significant (intercept = 2.89;  $p = .365$ , 95% CI  $[-4.18, 9.79]$ , the Duval and Tweedie procedure imputed no studies, and the funnel plot showed a symmetric distribution. For performance ( $k = 8$ ), Egger's test was not significant (intercept = 2.14;  $p = .674$ , 95% CI  $[-9.73, 14.02]$ ), the Duval

and Tweedie trim and fill procedure did not impute any studies, and the funnel plot showed a relatively symmetric distribution. All funnel plots can be inspected in Figure 5. Overall, each of the three indicators suggests that publication bias is rather absent. Hence, corroborating these findings with the fact that the sample includes both published ( $k = 10$ ) and unpublished ( $k = 4$ ) data, we can conclude that publication bias was not a concern for this meta-analysis.

### Utility analysis of JC interventions

In order to conduct the utility analysis, we used the most reliable effect revealed by the meta-analysis. More precisely, we selected the effect that met the following two cumulative criteria: to be homogeneous and statically significant. The only effect that satisfied both conditions was the one on task performance for healthcare professionals ( $k = 3$ ). The overall effect size is  $g = 0.47$  (95% CI  $[0.21, 0.73]$ ;  $p < .001$ ), which represents small to medium effectiveness. The test of heterogeneity was non-significant ( $Q_{(2)} = 0.09$ ,  $p = .955$ ), and the amount of heterogeneity was estimated at  $\tau^2 = 0.00$ . The  $I^2$  statistic also indicated 0.0% variability.

Considering that the longest study regarding the effectiveness of JC interventions on the job performance of healthcare professionals was conducted over a three-months period (Gordon et al., 2018), and the results showed a significant increase in job performance three months after the intervention, we have chosen the value of .25 for T (three months of a year means 25% of a year). There are no studies that show the impact of interventions over a longer period. We made estimations for a single employee. The formula for computing the dollar value for a performance increase, before subtracting costs, is (d)(SDy) per employee. We have

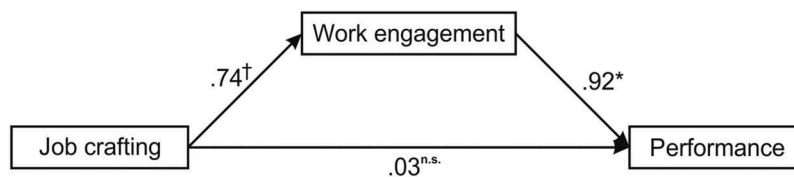


Figure 4. The indirect relationship between the effects on overall job crafting and those on overall performance through the effects on work engagement.

Notes. † < .10; \* < .05, n.s. = non-significant. Standardized coefficients ( $\beta$ ) are displayed on each relationship.

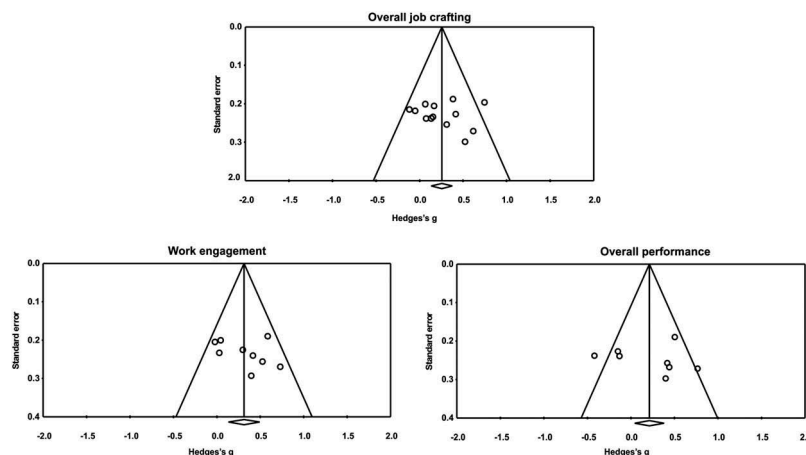


Figure 5. Funnel plots for publication bias.

estimated SDy to be 40% of the employee's salary (Hazer & Highhouse, 1997). Based on the results of our meta-analysis, we consider  $d$  to be 0.47 for healthcare employees. Given that Hedges's  $g$  is a measure of standardized mean difference that is corrected for small sample bias (Hedges & Olkin, 1985), it can replace Cohen's  $d$  in the mathematical equation presented earlier. Based on Schmidt (2013), we chose an annual salary of \$50,000 for our computation. Therefore, the dollar value increase in output is  $(0.47)(0.40)(\$50,000) = \$9400/\text{year}$  per employee (before subtracting costs) as a result of a JC intervention. Using the values in Schmidt (2013), we chose a value of \$40 for  $C$ . JC interventions represent a relatively new concept in the field, and few practitioners provide such human resources management services, so it is challenging to estimate the real cost of such an intervention. We have looked at the costs of interventions involving similar practices (e.g., establishing work-related objectives), and we have chosen the value proposed by Schmidt (2013). Therefore:

$$\begin{aligned}\text{Dollar Value} &= (0.25)(\$9400) - (\$40) \\ &= \$2,310/\text{three months}/\text{employee}\end{aligned}$$

Since the effectiveness of the intervention may vary from one situation to another, we have also calculated its impact based on confidence intervals ( $g = 0.47$ , 95% CI [.21, .73]). For the lower limit ( $g = 0.21$ ), the dollar value increase in output would be \$1,010/three months/employee, and for the highest one ( $g = 0.73$ ), it would be \$3,610/three months/employee. Considering that the cost per person was estimated based on the values used in other types of interventions, we followed the recommendations of Cascio and Boudreau (2011) and conducted a break-even analysis. This analysis is the estimation of the smallest or the highest value of any given parameter that will generate a positive utility or payoff. In our case, the break-even analysis allows us to estimate the minimum cost per employee from which the intervention would no longer be profitable (i.e., it will lead to no increase in revenue from improved performance). Based on our calculations, it turns out that for an annual salary of \$50,000 the cost of the intervention per employee should not exceed \$2,350, for an annual salary of \$40,000 it should not exceed \$1,880, for \$30,000 it should not exceed \$1,410, and for \$20,000 it should not exceed \$940. For lower costs than those presented, interventions should be profitable (i.e., should break-even).

As already mentioned,  $d$  is equal to 0.47 for healthcare employees. Regarding SDp, Hunter, Schmidt, and Judiesch (1990) computed it on a massive volume of data and showed that it depends significantly on the job level. For unskilled jobs, SDp is 0.20, meaning that those unskilled employees who are one standard deviation above the mean produce 20% more than the average employee. For mid-level jobs, SDp is 0.30, and for professional/managerial jobs SDp is 0.50. Given that studies in which the effectiveness of JC interventions was tested have included doctors or nurses, we have chosen the 0.30 value for SDp. Therefore:

$$\begin{aligned}\text{Percentage Increase} &= (0.47)(0.30) = 0.141 \\ &= 14.10\%/\text{three months}\end{aligned}$$

As already computed, the percentage increase in output is 14.10% for three months after the intervention. Therefore:

$$\begin{aligned}\text{Reduced Labor Costs} &= 100 - 100/(1 + 0.141) \\ &= 12.36\%/\text{three months}\end{aligned}$$

## Discussion

### Summary of findings and theoretical implications

This study has investigated two main questions: (1) whether JC interventions are effective and under which conditions, and (2) what is the financial impact of JC interventions on companies that implement them? Our analysis indicated statistically significant and small effects of interventions on JC and two of its components, seeking challenges and reducing demands. Our results also indicated positive, small, and significant effects on work engagement and contextual performance. There were no statistically significant effects on seeking resources, task performance, and adaptive performance. Therefore, the answer to the first question is (at least partially) affirmative: JC interventions are effective in increasing JC, work engagement, and contextual performance. Almost all the results were based on heterogeneous data. Thus, we also tried to find out whether specific features of the various interventions are associated with a higher impact on outcomes. What we found was that the effect on work engagement was significantly moderated by the type of objective participants had to set. Those who set objectives which combined individual and organizational needs reported a moderate level of engagement, as compared with participants who set goals related solely to their own needs, for which the effect was small. Another finding was the significant effect of employees' occupation on task performance; interventions produced significant, small to moderate and homogeneous increases in task performance for healthcare employees, but not for teachers.

Regarding the second question, our utility analysis based on the effect of JC interventions on performance indicates substantial benefits regarding dollar value increases in output, the percentage increase in output, and reduced labour costs in the field of medical care. Interventions will lead to an increase of \$2,310/three months/employee in revenue from improved performance for the next three months following the intervention and a 14.10% increase in output (or to a 12.36% decrease in labour costs) for the next three months. Our break-even analysis suggested that the cost of the intervention per employee should not exceed between \$2,350 (for an annual salary of \$50,000) and \$940 (for an annual salary of \$20,000). As noted, in performing these analyses, we selected the most reliable effect (i.e., statistically significant and homogeneous) obtained for task performance, namely the effect on healthcare staff. Yet, to cautiously interpret these results one must also acknowledge that the number of studies that provided these data was very small ( $k = 3$ ), all were conducted in the Netherlands, and two came from the same team of investigators (i.e., Gordon et al., 2018; Study 1 and Study 2).

Regarding theoretical implications, the data support the indirect effect of JC behaviours on performance through employee engagement. This result brings additional evidence in favour of the JD-R model, showing that, as predicted by Bakker and Demerouti (2014), when employees are encouraged to craft their jobs, they will also report a higher level of work engagement and,

consequently, elevated levels of performance. This indirect effect reflects the presumed mediational process that links JC with performance and has the advantage (as compared to prior similar results) to be based on experimental findings. However, it is important to mention that all the data were collected at the same time, namely at post-intervention. Stronger evidence of the actual temporal sequencing that is suggested by this mediation would have been provided if we had access to multiple measurements after the interventions. This way we could have tested if the changes in post-test (T1) JC behaviours are related with changes in follow-up (T3) performance *via* the mediation of the follow-up changes in work engagement (T2). Considering this limitation, we also tested the indirect effect of the three variables in all their possible combinations (each of them subsequently taking the roles of independent variable, mediator, or dependent variable). The only significant mediated relationship remained the one stipulated by the JD-R model, a fact that offers more robustness to these results. There are also other limitations regarding the tested indirect effect which need to be considered while interpreting the result, i.e., it is based on a very small sample of effects ( $k = 6$ ), the path between JC and work engagement was partially significant, and the effect on overall performance was highly inconsistent.

### Practical implications

From a practical point of view, if we compare our results with those revealed on other types of interventions, JC programs are similarly effective in increasing work engagement ( $g = 0.31$ , 95% CI [0.14, 0.50]), as compared to health promotion ( $g = 0.14$ , 95% CI [0.02, 0.26]), leadership trainings ( $g = 0.14$ , 95% CI [0.01, 0.30]), interventions that directly aim to increase job resources ( $g = 0.40$ , 95% CI [-0.04, 0.84]) and personal resources ( $g = 1.00$ , 95% CI [-0.20, 2.20]) (see Knight, Patterson, & Dawson, 2017). The confidence interval of the effect size for JC interventions overlaps with the ones meta-analytically obtained by Knight et al. (2017) for the other interventions. Therefore, stimulating JC behaviours is one of the effective strategies that organizations can use to increase employee engagement. During JC interventions, participants analyse their previous workplace behaviours and their impact on wellbeing and performance. Afterwards, they set goals and plan new behaviours in order to increase resources and challenges and to boost work engagement and performance (e.g., Demerouti et al., 2017; Van den Heuvel et al., 2015). Our results also show that JC programs which include organizational defined objectives, in addition to the individual crafting goals, are more effective in increasing work engagement. The activity of crafting a job enhances employees' efforts to learn and engage their capabilities, but without being sustained and supported, their effects would not last in time (Harju, Hakanen, & Schaufeli, 2016). Therefore, our findings on the importance of job crafting objective(s) should be taken into consideration from a practical point of view, but cautiously, as only two samples belonging to the same author (Gordon et al., 2018), out of a total of nine, used the method of combined objectives. By combining the needs and desires of the employee with specific organizational goals, the employee can benefit

from the recognition of achieving an objective, most likely linked to his job performance and receive feedback.

Considering the impact on performance, JC interventions enhance the task performance of healthcare employees; the effect is smaller than the one of organizational training ( $d = 0.62$ , 95% CI [0.05, 1.19]) (Arthur, Bennett, Edens, & Bell, 2003), but similar to the effect of goal setting ( $d = 0.46$ ) (see Schmidt, 2013). However, it is important to note that this result applies only to healthcare professionals and the effect sizes of organizational training and goal setting are independent of the occupation of the participants in the interventions. JC interventions increase performance by encouraging employees to adjust their job characteristics – the mechanism by which these interventions increase performance is different from the one used in training (acquiring knowledge, learning new behaviours) and in goal setting (focus, effort, persistence), so we expect JC interventions to have an incremental effect on performance, beyond existing interventions. Moreover, JC interventions have a small but statistically significant effect on contextual performance. Existing literature reviews on contextual performance do not even mention interventions to increase organizational citizenship behaviours (LePine, Erez, & Johnson, 2002; Podsakoff, MacKenzie, Paine, & Bachrach, 2000). Yet, the data show an association between high-performance HR practices and service-oriented organizational citizenship behaviours (Sun, Aryee, & Law, 2007). Thus, JC interventions represent a new human resources practice that companies can use to increase this important component of contextual performance. Finally, JC interventions do not alter adaptive performance. These results may be explained by the fact that in one of the studies, the impact on adaptive performance was tested in the context of organizational change due to austerity measures. These interventions do not seem to be a practical solution in stimulating adaptive performance under austere conditions. In conclusion, practitioners can implement JC interventions to increase task performance in healthcare settings and contextual performance in general.

The key practical implication of our study is given by the results of the utility analysis. First, it offers practitioners a mean to communicate the financial value of these types of interventions, which can convince managers to implement such programs in their companies. As far as we know, it is the first time when the financial value of proactive behaviours at work is highlighted. This is an essential step in increasing the credibility of research into proactive behaviours at work and of interventions that stimulate them. In the modern business environment, implementing such interventions can be a significant competitive advantage that companies may ignore in the absence of evidence showing financial benefits. This utility analysis can create more awareness about JC and may increase the investments of companies in JC interventions. Also, it may raise interest in proactive behaviours in general and in their outcomes for organizations. JC is just one of the types of proactive behaviours in which employees can get involved (Crant, 2000; Grant & Parker, 2009; Hornung et al., 2010). This estimation of their financial impact may stir the curiosity of more researchers to conduct similar studies also regarding other proactive behaviours, such as identifying opportunities for improvement, positively challenging the status quo or problem prevention. Accordingly, such pragmatic translation of the interventions' effectiveness could tighten the gap between scientists and practitioners.

## Limitations

Our meta-analysis has several limitations. Firstly, the number of included studies was rather low. The concept of JC is relatively new (Wrzesniewski & Dutton, 2001), and quantitative measurement methods have emerged only recently (Tims et al., 2012). Therefore, developing and testing JC interventions has only been possible in recent years. The lack of studies in which interventions were tested is not specific to JC, other meta-analyses in organizational psychology being characterized by the same limitation (e.g., Knight et al., 2017; Maricuțoiu, Sava, & Butta, 2016). The small number of studies reduces confidence in the conclusions and impedes the testing of a broader palette of moderators.

Secondly, in most studies, performance was measured using participants' self-ratings of task performance (e.g., Van Wingerden et al., 2016). To draw more valid conclusions, objective measurements of performance before and after the interventions are needed. For example, Gordon et al. (2018) found a significant effect of a JC intervention for individual performance (self-reports), but not for objective measurements of performance (percentage of old patients that had been screened by the medical specialists and nurses). These results indicate that scientists need to carry out more studies in which objective measurements are used to determine the effectiveness of the interventions.

Thirdly, this meta-analysis considered only three outcomes (JC behaviours, job performance, and work engagement). However, cross-sectional and longitudinal studies on JC also revealed other relevant consequences for organizations, such as better person-job fit (e.g., Tims, Derks, & Bakker, 2016), and an increase in customer satisfaction and loyalty (Siddiqi, 2015). Measuring such outcomes can highlight additional mechanisms through which JC interventions influence performance. Also, in the case of customer satisfaction and loyalty, the results can provide more objective data on the practical impact of JC interventions.

Fourthly, majority of the studies included in the meta-analysis had very short-term follow-ups, therefore impeding us to estimate the long-term effectiveness and utility of the interventions. Studies that are conducted over longer periods of time can indicate when the effect disappears and, thus at what time intervals the intervention needs to be repeated in order to maintain employee JC behaviours. Moreover, studies with long-term follow-ups can allow us to easily estimate the return of investment for JC programs, knowing the time period when the effect on performance still exists, and the size of the effect in each stage. Such information can lead to more objective HR decisions.

Overall, the quality (internal validity) of the included studies was rather unclear. Despite the fact that eleven out of thirteen studies were assessed with a low risk of bias for at least half of the internal validity criteria, also eleven out of thirteen had selection problems. Still, the meta-regression analyses revealed that study quality was not related to effectiveness. However, to minimize the risk of internal bias, future studies should firmly comply with highly standardized guidelines for designing and reporting trials for non-pharmacological interventions (e.g., CONSORT; Boutron, Moher, Altman, Schulz, & Ravaut, 2008).

Last but not least, the external validity of the results is a noticeable liability since most of the studies have been performed in the Netherlands. It makes it hard to extrapolate the applicability of JC interventions in other cultural settings. There is a high probability that the results related to job crafting will differ in other types of cultures. According to Hofstede (1983), the Netherlands is characterized by individualism, low power distance, femininity, and weak uncertainty avoidance. Considering that job crafting is a self-initiated proactive behaviour meant to balance the job demands and job resources in order to increase the well-being of the employee (Bakker & Demerouti, 2014), there is a possibility that those cultures which are characterized by weak uncertainty avoidance, are more open to taking risks and seeking challenges, as well as looking for achieving results in their own interest, and to exhibit more crafting behaviours than those that have a more conservative, group-oriented approach. A recent study compared the Dutch and the American health care professionals' job crafting behaviours (Gordon, Demerouti, Le Blanc, & Bipp, 2015), and the only cultural difference was related to the femininity versus masculinity dimension. The researchers concluded that in a feminine culture such as the Netherlands, the job resources are higher, and employees craft their job by seeking resources, whereas in a masculine culture as in the US, job demands are higher, and the job crafting behaviours are oriented towards reducing them. Hence, there might be cross-cultural differences which point to the need for "crafting" JC interventions to local specificities.

## Future research directions

Considering that job performance was most often measured using self-report questionnaires, it is essential to use other types of measurements to draw a more explicit conclusion about the effect of JC interventions on job performance. In future studies on JC, researchers can use colleague-ratings of task performance (e.g., Bakker et al., 2012), or ratings from supervisors. Also, they can use customer satisfaction and loyalty (e.g., Siddiqi, 2015), or objective measurements of productivity and efficiency to capture the impact of interventions on task performance. Beyond that, future studies may consider different variables that can explain the mechanisms through which JC interventions alter performance, besides work engagement. Some of these may be person-job fit (Chen, Yen, & Tsai, 2014; Lu, Wang, Lu, Du, & Bakker, 2014), psychological capital (Vogt, Hakanen, Brauchli, Jenny, & Bauer, 2016), meaningfulness of work (Tims et al., 2016), or flourishing (Demerouti, Bakker, & Gevers, 2015). Also, more follow-up measures are needed to capture the long-term effectiveness of such programs. Future longitudinal studies will lead to a clearer picture regarding the time period in which the effect on engagement and performance still exists and, therefore, to more realistic estimates of the effectiveness and utility of such interventions. Repeated measures over longer periods of time after the intervention are also necessary for proper mechanisms of change (mediation) analyses (David & Sava, 2015). These types of designs are the key for unfolding the processes between JC behaviours and their correlates.

As already mentioned, most studies have been conducted in the Netherlands. Therefore, since the cross-cultural findings suggest that cultural differences may have an impact on the way JC works for different employees, it is hard to generalize



the results. Thus, not only that future trials conducted on different cultures are needed, but also cross-cultural studies regarding JC behaviours would be insightful. Furthermore, at a smaller scale, job autonomy is associated with a higher level of JC (Petrou et al., 2012). Hence, JC interventions may not work in companies where organizational culture does not allow a high level of autonomy for employees. Based on the same reasoning, interventions may not have the same effect on all employees in the same company. A possible moderator may be job level (Berg et al., 2010), and future programs should also consider this variable.

When comparing the Dutch (Petrou et al., 2012) and American (Wrzesniewski & Dutton, 2001) approach to job crafting, Le Blanc et al. (2017) argue that the Dutch approach focuses on behavioural aspects targeting the achievement of a balance between job demands and job resources, excluding the cognitive dimension of the American approach. Future intervention programs should also focus on targeting this dimension, and besides this, future operationalisations should focus on capturing it. Even though several of the studies report building the job crafting intervention on the Michigan Job Crafting Exercise (Berg, Dutton, & Wrzesniewski, & Bakker, 2010), they operationalized them based on the JD-R model (Van Wingerden et al., 2016, 2017a, 2017b, 2017), thus lacking insights on the actual importance of the cognitive dimension.

One of the most interesting findings on JC is that it is characterized by a contagion effect. In a diary study conducted on 55 dyads of co-workers, it was found that JC behaviours transfer from one employee to another, especially when employees have a high level of empathy (Peeters, Arts, & Demerouti, 2016). Also, the imitation of JC behaviours is one of the mechanisms by which work engagement is transferred from one employee to another (Bakker, Rodríguez-Muñoz, & Sanz Vergel, 2016). Future research can investigate the impact of JC interventions on employees who are not directly involved in the intervention. Researchers can analyse whether colleagues of people who have taken part in the program imitate the new behaviours acquired by their peers and thereby also reach a higher level of JC and work engagement. Thus, we can verify if the impact of interventions spreads to organizations without the need for all employees to be directly involved. If shown to exist, this crossover effect would have a massive pragmatic impact since the training cost will be narrowed to only (some) key employees.

Finally, future studies can investigate the possible negative effects of JC interventions. For example, by analysing 103 dyads of employees, Tims, Bakker, and Derks (2015b) found that when one member of the dyad decreases his or her hindering demands, the other one reports higher levels of workload and conflict, which ultimately leads to burnout. None of the existing studies analyse the effects of interventions on participants' colleagues. This is a major gap, as the beneficial effects of JC interventions could be undermined by the negative consequences on colleagues or working teams. Moreover, following the intervention, participants may be tempted to reduce stressful, but necessary, hindering demands. Identifying these possible negative effects is an important step in finding solutions to prevent them.

## Conclusion

Job crafting interventions are a new HRM solution for organizational practitioners who aim to increase employee JC behaviours, work engagement, and contextual performance. These interventions can be effective in increasing task performance for healthcare workers, at least for three months after the interventions. Practitioners may use the results of the utility analysis to highlight the effectiveness of such solutions, showing that they lead to increases in revenue from the improved performance or to lower labour costs. From a theoretical point of view, results bring evidence in favour of the JD-R model (Bakker & Demerouti, 2014), supporting the predictions that employees who craft their jobs later report a higher level of work engagement and, furthermore, elevated levels of performance. JC is just one of the concepts that are associated with proactive behaviours at work; future research should capture the impact of other proactive behaviours on company performance and their economic value for organizations.

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## References

- Arthur, W., Bennett, W., Edens, P. S., & Bell, S. T. (2003). Effectiveness of training in organizations: A meta-analysis of design and evaluation features. *Journal of Applied Psychology*, 88, 234–245.
- Arthur, W., Kyte, T., Villado, A., Morgan, C., & Roop, S. (2011). Introducing a subject matter expert-based utility analysis approach to assessing the utility of organizational interventions such as crew resource management training. *International Journal of Aviation Psychology*, 21, 191–215.
- Bakker, A. B., & Demerouti, E. (2014). Job demands-resources theory. In P. Y. Chen & C. L. Cooper (Eds.), *Work and wellbeing: Wellbeing: A complete reference guide* (Volume III; pp. 37–64). Chichester, UK: Wiley-Blackwell.
- Bakker, A. B., & Bal, P. M. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology*, 83, 189–206.
- 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., & Ten Brummelhuis, L. L. (2012). Work engagement, performance, and active learning: The role of conscientiousness. *Journal of Vocational Behavior*, 80, 555–564.

- Bakker, A. B., Hakanen, J. J., Demerouti, E., & Xanthopoulou, D. (2007). Job resources boost work engagement, particularly when job demands are high. *Journal of Educational Psychology*, 99, 274–284.
- Bakker, A. B., Rodríguez-Muñoz, A., & Sanz Vergel, A. I. (2016). Modelling 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.
- Bakker, A. B., van Veldhoven, M., & Xanthopoulou, D. (2010). Beyond the Demand-Control model: Thriving on high job demands and resources. *Journal of Personnel Psychology*, 9, 3–16.
- Balducci, C., Fraccaroli, F., & Schaufeli, W. B. (2010). Psychometric properties of the Italian version of the Utrecht Work Engagement Scale (UWES-9). A Cross-cultural Analysis. *European Journal of Psychological Assessment*, 26, 143–149. doi: 10.1027/1015-5759/a000020
- Barrick, M. R., Day, D. V., Lord, R. G., & Alexander, R. A. (1991). Assessing the utility of executive leadership. *The Leadership Quarterly*, 2, 9–22.
- Berg, J. M., Dutton, J. E., & Wrzesniewski, A., & Baker, W. E. (2010). *Job crafting exercise*. Ann Arbor, MI: Regents of the University of Michigan. Retrieved from <http://www.jobcrafting.org>
- Berg, J. M., Wrzesniewski, A., & Dutton, J. E. (2010). Perceiving and responding to challenges in job crafting at different ranks: When proactivity requires adaptivity. *Journal of Organizational Behavior*, 31, 158–186.
- Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2009). *Introduction to meta-analysis*. Chichester, UK: Wiley.
- Borenstein, M., Higgins, J., Hedges, L. V., & Rothstein, H. R. (2017). Basics of meta-analysis: I2 is not an absolute measure of heterogeneity. *Research Synthesis Methods*, 8, 5–18.
- Boudreau, J. W. (1991). Utility analysis for decisions in human resource management. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (pp. 621–745). Palo Alto, CA: Consulting Psychologists Press.
- Boudreau, J. W., & Ramstad, P. M. (2002). Strategic I/O psychology and the role of utility analysis models (CAHRS Working Paper #02-16). Ithaca, NY: Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies. Retrieved from <http://digitalcommons.ilr.cornell.edu/cahrswp/57>
- Boutron, I., Moher, D., Altman, D. G., Schulz, K. F., & Ravaud, F. (2008). Methods and processes of the CONSORT group: Example of an extension for trials assessing nonpharmacologic treatments. *Annals of Internal Medicine*, 148, W–66.
- Cabrera, E. F., & Raju, N. S. (2001). Utility analysis: Current trends and future directions. *International Journal of Selection and Assessment*, 9, 92–102.
- Cascio, W. F., & Boudreau, J. W. (2011). *Investing in people: Financial impact of human resource initiatives*. Upper Saddle River, NJ: FT Press.
- Chen, C.-Y., Yen, C.-H., & Tsai, F. C. (2014). Job crafting and job engagement: The mediating role of person-job fit. *International Journal of Hospitality Management*, 37, 21–28.
- Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, 64, 89–136.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences second edition*. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.
- \*Costantini, A., Demerouti, E., Ceschi, A., & Sartori, R. (2018, September). A job crafting intervention based on the theory of planned behaviour. Effects on cognitions, behaviour and work engagement. Paper presented at the 13th European Academy of Occupational Health Psychology Conference, Lisbon, PT. Abstract retrieved from: <https://app.oxfordabstracts.com/stages/211/programme-builder/submission/45865?backHref=/events/199/programme-builder/view/sort/author&view=published>
- Crant, J. M. (2000). Proactive behavior in organizations. *Journal of Management*, 26, 435–462.
- Daniels, K., Gedikli, C., Watson, D., Semkina, A., & Vaughn, O. (2017). Job design, employment practices and well-being: A systematic review of intervention studies. *Ergonomics*, 60, 1177–1196.
- David, D., & Sava, F. A. (2015). Designs for studying mediation. In R. Cautin & S. Lilienfeld (Eds.), *The encyclopedia of clinical psychology*. Hoboken, NJ: Wiley-Blackwell. doi: 10.1002/9781118625392.wbecp516
- Demerouti, E. (2014). Design your own job through job crafting. *European Psychologist*, 19, 237–247.
- Demerouti, E., Bakker, A., & Gevers, J. J. (2015). Job crafting and extra-role behavior: The role of work engagement and flourishing. *Journal of Vocational Behavior*, 91, 87–96.
- \*Demerouti, E., Xanthopoulou, D., Petrou, P., & Karagkounis, C. (2017). Does job crafting assist dealing with organizational changes due to austerity measures? Two studies among Greek employees. *European Journal of Work and Organizational Psychology*, 26, 574–589.
- Dierdorff, E. C., & Aguinis, H. (2018). Expanding job crafting theory beyond the worker and the job. *Management Research: Journal of the Iberoamerican Academy of Management*, 16, 225–247.
- \*Dubbelt, L. (2016). *Women to the top: Discovering facilitating factors for women's functioning in minority positions* (Doctoral dissertation). Retrieved from <https://pure.tue.nl/ws/portalfiles/portal/15655949>
- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ*, 315, 629–634.
- Ford, J. K., Baldwin, T. T., & Prasad, J. (2018). Transfer of training: The known and the unknown. *Annual Review of Organizational Psychology and Organizational Behavior*, 5, 201–225.
- \*Gordon, H. J., Demerouti, E., Le Blanc, P. M., Bakker, A. B., Bipp, T., & Verhagen, M. A. M. T. (2018). Individual job redesign: Job crafting interventions in healthcare. *Journal of Vocational Behavior*, 104, 98–114. doi: 10.1016/j.jvb.2017.07.002
- Goodman, S. A., & Syantec, D. J. (1999). Person-organization fit and contextual performance. *Do Shared Values Matter? Journal of Vocational Behavior*, 55, 254–275. doi: 10.1006/jvbe.1998.1682
- Gordon, H. J., Demerouti, E., Le Blanc, P. M., & Bipp, T. (2015). Job crafting and performance of Dutch and American health care professionals. *Journal of Personnel Psychology*, 14, 192–202.
- Grant, A. M., & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *The Academy of Management Annals*, 3, 317–375.
- Griffin, M. A., Neal, A., & Parker, S. K. (2007). A new model of work role performance: positive behavior in uncertain and interdependent contexts. *Academy of Management Journal*, 50, 327–347. doi: 10.5465/AMJ.2007.24634438
- Gwet, K. L. (2012). *Handbook of inter-rater reliability (Third edition)*. Gaithersburg: Advanced Analytics, LLC.
- Hakanen, J. J., Bakker, A. B., & Demerouti, E. (2005). How dentists cope with their job demands and stay engaged: The moderating role of job resources. *European Journal of Oral Sciences*, 113, 479–487.
- Halbesleben, J. R. B., & Wheeler, A. R. (2008). The relative roles of engagement and embeddedness in predicting job performance and intention to leave. *Work & Stress*, 22, 242–256.
- Harju, L. K., Hakanen, J. J., & Schaufeli, W. B. (2016). Can job crafting reduce job boredom and increase work engagement? A three-year cross-lagged panel study. *Journal of Vocational Behavior*, 95, 11–20.
- Hazer, J. T., & Highhouse, S. (1997). Factors influencing managers' reactions to utility analysis: Effects of SDY method, information frame, and focal intervention. *Journal of Applied Psychology*, 82, 104–112.
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis 1st Edition*. Orlando, FL: Academic Press.
- Hempel, S., Suttrop, M. J., Miles, J. N., Wang, Z., Maglione, M., Morton, S., ... Shekelle, P. G. (2011). *Empirical evidence of associations between trial quality and effect size* (Research Report No. 11-EHC045-EF). the Agency for Healthcare Research and Quality (US): Retrieved from [https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/trial-quality-effect-evidence\\_research.pdf](https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/trial-quality-effect-evidence_research.pdf)
- Higgins, J. P., & Green, S. (2011). *Cochrane handbook for systematic reviews of interventions (vol. 4)*. West Sussex: John Wiley & Sons.
- Highhouse, S. (1996). The utility estimate as a communication device: Practical questions and research directions. *Journal of Business and Psychology*, 11, 85–100.
- Hofstede, G. (1983). The cultural relativity of organizational practice and theories. *Journal of International Business Studies*, 14, 75–89.

- \*Holman, D., & Axtell, C. (2016). Can job redesign interventions influence a broad range of employee outcomes by changing multiple job characteristics? A quasi-experimental study. *Journal of Occupational Health Psychology, 21*, 284–295.
- Hornung, S., Rousseau, D. M., Glaser, J., Angerer, P., & Weigl, M. (2010). Beyond top-down and bottom-up work redesign: Customizing job content through idiosyncratic deals. *Journal of Organizational Behavior, 31*, 187–215.
- Hunter, J. E., Schmidt, F. L., & Judiesch, M. K. (1990). Individual differences in output variability as a function of job complexity. *Journal of Applied Psychology, 75*, 28–42.
- Knight, C., Patterson, M., & Dawson, J. (2017). Building work engagement: A systematic review and meta-analysis investigating the effectiveness of work engagement interventions. *Journal of Organizational Behavior, 38*, 792–812.
- \*Kooij, D. T., van Woerkom, M., Wilkenloh, J., Dorenbosch, L., & Denissen, J. J. A. (2017). Job crafting towards strengths and interests: The effects of a job crafting intervention on person-job fit and the role of age. *Journal of Applied Psychology, 102*, 971–982.
- \*Kooij, D. T., van Woerkom, M., & Kuijpers, E. (2018, September). Two job crafting intervention studies: Increasing person-job fit and work engagement of aging and busy employees. Paper presented at the 13th European Academy of Occupational Health Psychology Conference, Lisbon, PT. Abstract retrieved from <https://app.oxfordabstracts.com/stages/211/programme-builder/submission/44950?backHref=/stages/211/symposium/393/programme>
- Le Blanc, P. M., Demerouti, E., & Bakker, A. B. (2017). How can I shape my job to suit me better? Job crafting for sustainable employees and organizations. In N. Chmiel, F. Fraccaroli, & M. Sverke (Eds.), *An introduction to work and organizational psychology: An International perspective* (pp. 48–63). Hoboken, NJ: John Wiley & Sons. doi: 10.1002/9781119168058.ch3
- LePine, J. A., Erez, A., & Johnson, D. E. (2002). The nature and dimensionality of organizational citizenship behavior: A critical review and meta-analysis. *Journal of Applied Psychology, 87*, 52–65.
- Lu, C.-Q., Wang, H.-J., Lu, J.-J., Du, D.-Y., & Bakker, A. B. (2014). Does work engagement increase person-job fit? The role of job crafting and job insecurity. *Journal of Vocational Behavior, 84*, 142–152.
- Lyons, P. (2008). The crafting of jobs and individual differences. *Journal of Business Psychology, 23*, 25–36.
- Macan, T. H., & Foster, J. (2004). Manager's reactions to utility analysis and perceptions of what influences their decisions. *Journal of Business and Psychology, 19*, 241–253.
- Maricuțoiu, L. P., Sava, F. A., & Butta, O. (2016). The effectiveness of controlled interventions on employees' burnout: A meta-analysis. *Journal of Occupational and Organizational Psychology, 89*, 1–27.
- Metselaar, E. E. (1997). Assessing the willingness to change: *Construction and validation of the DINAMO*. NL: Free University of Amsterdam (Unpublished doctoral dissertation).
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine, 151*, 264–269.
- Morris, S. B. (2008). Estimating effect sizes from pretest-posttest-control group designs. *Organizational Research Methods, 11*, 364–386.
- Nielsen, K., & Abildgaard, J. S. (2012). The development and validation of a job crafting measure for use with blue-collar workers. *Work & Stress, 26*, 365–384.
- O'Shea, D., Lynch, L., Molina, A., & Cullinane, S. J. (2016). The impact of a relational job crafting intervention on trust and prosocial behaviours: A randomised controlled trial. [Word document]. Retrieved from <http://programme.exordo.com/fint2016/delegates/presentation/14/>
- Oldham, G. R., & Fried, Y. (2016). Job design research and theory: Past, present and future. *Organizational Behavior and Human Decision Processes, 136*, 20–35.
- Parker, S. K., Bindl, U. K., & Strauss, K. (2010). Making things happen: A model of proactive motivation. *Journal of Management, 36*, 827–856.
- Parker, S. K., Morgeson, F. P., & Johns, G. (2017). One hundred years of work design research: Looking back and looking forward. *Journal of Applied Psychology, 102*, 403–420.
- Peeters, M. C. W., Arts, R., & Demerouti, E. (2016). The crossover of job crafting between coworkers and its relationship with adaptivity. *European Journal of Work and Organizational Psychology, 25*, 819–832.
- 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*, 1020–1141.
- Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management, 26*, 513–563.
- Rauschenberger, J. M., & Schmidt, F. L. (1987). Measuring the economic impact of human resource programs. *Journal of Business and Psychology, 2*, 50–59.
- Roth, P. L., Bobko, P., & Mabon, H. (2002). Utility analysis: A review and analysis at the turn of the century. In N. Anderson, D. S. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), *Handbook of industrial, work and organizational psychology, Volume 1: Personnel psychology*. (pp. 383–384). Thousand Oaks, CA: Sage Publications Ltd.
- Rudolph, C. W., Katz, I. M., Lavigne, K. N., & Zacher, H. (2017). Job crafting: A meta-analysis of relationships with individual differences, job characteristics, and work outcomes. *Journal of Vocational Behavior, 102*, 112–138.
- Sakuraya, A., Shimazu, A., Imamura, K., Namba, K., & Kawakami, N. (2016). Effects of a job crafting intervention program on work engagement among Japanese employees: A pretest-posttest study. *BMC Psychology, 4*, 49–58.
- Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: *Journal of Happiness Studies, 3*, 71–92.
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a brief questionnaire: a cross-national study. *Educational and Psychological Measurement, 66*, 701–16. doi: 10.1177/0013164405282471
- Schmidt, F. L. (2013). The economic value of goal setting to employers. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal and task performance* (pp. 16–20). New York: Routledge.
- Schmidt, F. L., Hunter, J. E., Outerbridge, A. N., & Trattner, M. H. (1986). The economic impact of job selection methods on size, productivity, and payroll costs of the federal work force: An empirically based demonstration. *Personnel Psychology, 39*, 1–29.
- Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., ... Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *BMJ, 349*, g7647.
- Siddiqi, M. A. (2015). Work engagement and job crafting of service employees influencing customer outcomes. *Vikalpa, 40*, 277–292.
- Slemp, G., Kern, M., & Baker, R. (2017). An empirical evaluation of a job crafting intervention: Recommendations for future research. In J. Plomp, M. Tims, & S. Parker (Chairs), (eds.), *Crafting job crafting research: Taking context into account*. Academy of Management Proceedings, 2017. doi: 10.5465/ambpp.2017.15373symposium
- Sun, L., Aryee, S., & Law, K. S. (2007). High-performance human resource practices, citizenship behavior, and organizational performance: A relational perspective. *The Academy of Management Journal, 50*, 558–577.
- Tims, M., Bakker, A. B., & Derks, D. (2012). The development and validation of the job crafting scale. *Journal of Vocational Behavior, 80*, 173–186.
- Tims, M., Bakker, A. B., & Derks, D. (2015a). Job crafting and job performance: A longitudinal study. *European Journal of Work and Organizational Psychology, 24*, 914–928.
- Tims, M., Bakker, A. B., & Derks, D. (2015b). Examining job crafting from an interpersonal perspective: Is employee job crafting related to the Well-Being of colleagues? *Applied Psychology, 64*, 727–753.
- 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 and Organization Management, 38*, 427–454.
- Tims, M., Derks, D., & Bakker, A. B. (2016). Job crafting and its relationships with person-job fit and meaningfulness: A three-wave study. *Journal of Vocational Behavior, 92*, 44–53.
- \*Van den Heuvel, M., Demerouti, E., & Peeters, M. (2015). The job crafting intervention: Effects on job resources, self-efficacy, and affective

- well-being. *Journal of Occupational and Organizational Psychology*, 88, 511–532.
- Vanbelle, E. (2016). *Job crafting: An overarching approach* (Doctoral dissertation). Retrieved from: [https://elsvanbelle.files.wordpress.com/2017/06/druk\\_elsvanbelle\\_-phd\\_job-crafting-an-overarching-approach-final-p2912.pdf](https://elsvanbelle.files.wordpress.com/2017/06/druk_elsvanbelle_-phd_job-crafting-an-overarching-approach-final-p2912.pdf)
- \*Verelst, L., de Cooman, R., van Laar, C., & Meussen, L. (2018, September). The work-home interface: Lowering conflict and fostering enrichment via a job crafting micro-intervention. *Paper presented at the 13th European Academy of Occupational Health Psychology Conference*, Lisbon, PT. Abstract retrieved from <https://app.oxfordabstracts.com/stages/211/programme-builder/submission/45865?backHref=/events/199/programme-builder/view/sort/author&view=published>
- Vogt, K., Hakonen, J. J., Brauchli, R., Jenny, G. J., & Bauer, G. F. (2016). The consequences of job crafting: A three-wave study. *European Journal of Work and Organizational Psychology*, 25, 353–362.
- Van Mersbergen, J. (2012). *The test and evaluation of a job crafting intervention in healthcare* (Master's thesis). Retrieved from <https://pure.tue.nl/ws/portalfiles/portal/47045798>
- \*Van Wingerden, J., Bakker, A. B., & Derks, D. (2016). A test of a job demands-resources intervention. *Journal of Managerial Psychology*, 31, 686–701.
- \*Van Wingerden, J., Derks, D., & Bakker, A. B. (2017). The impact of personal resources and job crafting interventions on work engagement and performance. *Human Resource Management*, 56, 51–67.
- \*Van Wingerden, J., Bakker, A. B., & Derks, D. (2017a). The longitudinal impact of a job crafting intervention. *European Journal of Work and Organizational Psychology*, 26, 107–119.
- \*Van Wingerden, J., Bakker, A. B., & Derks, D. (2017b). Fostering employee well-being via a job crafting intervention. *Journal of Vocational Behavior*, 100, 164–174.
- 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](https://doi.org/10.1177/014920639101700305)
- Wrzesniewski, A., & Dutton, J. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, 26, 179–201.
- Xanthopoulou, D., Bakker, A.B., Heuven, E., Demerouti, E., & Schaufeli, W.B. (2008). Working in the sky: a diary study on work engagement among flight attendants. *Journal of Occupational Health Psychology*, 13, 345–356. doi: [10.1037/1076-8998.13.4.345](https://doi.org/10.1037/1076-8998.13.4.345)