The development and validation of a job crafting measure for use with blue-collar workers

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Job crafting describes a set of proactive behaviours in which employees may engage to shape their work in order to minimize hindering job demands and maximize resources and challenging demands. Such behaviours may be particularly important among blue-collar workers whose jobs are characterized by poor working conditions and low well-being. We present the development and adaptation of a job crafting measure that may be used among blue-collar workers, based on an existing scale by Tims, Bakker, and Derks (2012) that was not specifically developed for blue-collar workers. We test the validity and reliability of the measure in a longitudinal study based on multiple source information from mail delivery workers in Denmark (\(N = 362\) at Time 1; \(N = 408\) at Time 2). Results indicate the presence of five job crafting dimensions: increasing challenging demands, decreasing social job demands, increasing social job resources, increasing quantitative demands and decreasing hindering job demands. These can be reliably measured with 15 items. The measure shows acceptable discriminant and criterion validity, and test-retest reliability. The findings extend the application of the original questionnaire. They also add to knowledge of the job crafting behaviours in which blue-collar workers engage and link them to well-being outcomes.

Keywords: job crafting; validation; well-being; questionnaire; scale development

Introduction

Organizations increasingly expect jobholders to act on information and react to unusual circumstances by demonstrating proactive behaviours (Erdogan & Bauer, 2005). Proactive employees identify opportunities and act on them, they show initiative and seek out challenging situations (Belschak & Den Hartog, 2010; Berg, Wrzesniewski, & Dutton, 2010), they construe their roles more broadly, and they redefine their jobs to include new tasks and goals (Belschak & Den Hartog, 2010). A particular form of proactive behaviour is job crafting, where employees actively create, shape and alter the work they perform, actively revising and improving their tasks, and implementing ideas and solving problems (Berg et al., 2010; Wrzesniewski & Dutton, 2001). Through job crafting, individuals actively strive to mobilize job resources to fulfil their needs and thrive at work (Tims & Bakker, 2010), and they proactively craft a job where they can use their skills and have opportunities to grow.
(Tims & Bakker, 2010). Recently a questionnaire has been developed that measures job crafting behaviours (Tims, Bakker, & Derks, 2012).

According to the job demands-resources model (JD-R) different occupations are characterized by specific configurations of job demands and job resources (Bakker & Demerouti, 2007), which again implies that different types of job crafting behaviours may be enacted differentially across occupational groups. Berg et al. (2010) found that blue-collar workers and white-collar workers experience different opportunities for job crafting and their job crafting behaviours differ. Upon inspection of the items in the Tims et al. (2012) questionnaire we found that some items referred primarily to mental work, some were complicated in their wording, and others were ambiguous as to whether they referred to job crafting behaviours or other aspects of the job (see the section of the present paper on Development of the job crafting scales). Furthermore, the current research project’s steering groups (employee and manager representatives, HR consultants and an occupational health consultant) pointed out that not all items were relevant to a blue-collar worker sample. Therefore we decided to adapt the Tims et al. (2012) questionnaire items to a blue-collar sample based on interviews (as will be described in the Method section). In this paper we present and validate a job crafting measure adapted for a blue-collar setting based on Tims et al.’s (2012) measure and on interviews with mail delivery workers.

**Job crafting in occupational health psychology**

Job crafting has been defined as “the physical and cognitive changes individuals make in the task or relational boundaries of their work” (Wrzesniewski & Dutton, 2001, p. 179). Originally, three types of job crafting were identified. *Cognitive job crafting* involves changing the way the individual perceives his or her job; *task job crafting* involves changing the content of work, i.e. minimizing negative aspects of work or maximizing interesting job content; and *relational job crafting* involves changes in the quality and amount of interaction with others at work, be it customers, superiors or coworkers (Wrzesniewski & Dutton, 2001). It has been argued that cognitive job crafting is more like avoidance coping rather than a proactive behaviour, as individuals adapt their conceptualizations of the job rather than the job itself (Tims & Bakker, 2010).

According to person-job fit theory (Kristof-Brown, Zimmerman, & Johnson, 2005), poor employee well-being can result from a mismatch between the abilities, needs and values of the individual and the characteristics of the job. Job crafting can be seen as the individual’s attempt to adjust the job to match his or her needs, values and abilities. While the job crafting literature originally focused on employees’ meaning of work and work identity (Wrzesniewski & Dutton, 2001), recently the concept of job crafting has been discussed in occupational health psychology within the framework of the JD-R model (Tims et al., 2012; Tims & Bakker, 2010). It has been suggested that stressors may be divided into challenge-related stressors (stemming from demands and situations that may potentially be stressful but are perceived to offer potential gains for the individual) and hindrance-related stressors (demands or situations which interfere with the individual’s achievements and are appraised as threats; Rodell & Judge, 2009), and that employees may engage in job crafting to both minimize hindering demands and to increase challenging demands.
It has been argued that even in the most routine jobs employees engage in job crafting (Wrzesniewski & Dutton, 2001) and therefore job crafting may be particularly important for occupational groups characterized by poor working conditions, i.e. blue-collar workers (Karasek & Theorell, 1990), as job crafting may help employees minimize stressors and maximize job resources and improve their well-being (Tims & Bakker, 2010). Such research offers important information about how organizations may improve employee well-being through the encouragement of job crafting.

**Measuring job crafting**

Research on job crafting has primarily been qualitative (Berg et al., 2010; Wrzesniewski & Dutton, 2001) or has used brief quantitative measures (Leana, Appelbaum, & Shevchuk, 2009); however, neither type of research has been placed within an occupational health psychology framework. Recently, Tims et al. (2012) developed and validated a measure of job crafting behaviours based on the JD-R model, including a distinction between hindering and challenging job demands (Rodell & Judge, 2009). They identified four scales of job crafting behaviours aimed at decreasing hindering job demands, increasing social job resources, increasing challenging job demands and increasing structural job resources (increasing variety, opportunities for development, and autonomy).

In this paper we present and validate an adapted version of the job crafting measure for blue-collar workers. We expect to find a similar scale structure (Increasing social job resources, Increasing challenging job demands, Increasing structural job resources, and Decreasing hindering job demands) as Tims et al. (2012), after adapting their questionnaire to a blue-collar sample (*Hypothesis 1*). We expect to find separate scales, as the different kinds of job crafting behaviours target specific aspects of the working environment, which have been found to have separate effects on well-being (Crawford, LePine, & Rich, 2010; Podsakoff, LePine, & LePine, 2007). We extend the current research by Tims et al. (2012) as before conducting the quantitative survey we adapted the job crafting measure to blue-collar workers based on interviews, and demonstrate that job crafting is a relevant construct for assessing the adaptive behaviours of blue-collar workers. Furthermore, we examine test-retest reliability of the adapted questionnaire and its predictive power over time. The Tims et al. (2012) study design was cross-sectional and therefore did not report test-retest reliability.

**Job crafting and its relationship with well-being outcomes**

Studying the associations with well-being outcomes is important to determine whether the degree to which employees engage in job crafting behaviours is related to their well-being, and it is an essential step in the validation process. It has been well-established that working conditions are closely related to burnout, work engagement and job satisfaction (Crawford et al., 2010; Podsakoff et al., 2007). Based on the research that has established the positive relationship between a good person-job fit and well-being (Kristof-Brown et al., 2005) we would expect better well-being if employees “job craft” to improve working conditions, thereby using it to maximize the person-job fit.

According to the JD-R model, two underlying psychological processes determine the well-being of employees (Bakker & Demerouti, 2007). First, the health
impairment process suggests that high demands combined with few resources deplete employees’ well-being. Over time this may lead to a negative spiral in which employees suffering from poor well-being will lose job resources, thus finding it even more difficult to deal with the demands of the job. However, this will only be the case for job demands that hinder the individual in achieving his or her goals (Rodell & Judge, 2009). In their review Crawford et al. (2010) found hindering demands to be negatively related to work engagement and positively related to burnout, and in a meta-analysis Podsakoff et al. (2007) found hindrance stressors to be negatively related to job satisfaction. Thus it can be assumed that exerting job crafting behaviours that minimize hindering job demands will be positively associated with job satisfaction and work engagement and negatively associated with burnout.

Second, the motivational process assumes that resources have a motivational potential such that individuals in possession of resources will mobilize them to gain more resources and as a result experience better well-being (Bakker & Demerouti, 2007). According to Conservation of Resources (COR) theory (Hobfoll, 1989), maximizing social job resources and task resources will have a positive effect on well-being because larger pools of resources enable the individual to protect themselves from resource depletion and deal with the demands of the environment. Sonnentag, Dormann, and Demerouti (2010) argued that when there are enough challenging things to do at work, employees are more likely to mobilize their energy and as a result may feel more engaged at work. We propose that individuals who job craft to increase their resources and prevent resource depletion will also report higher levels of job satisfaction and work engagement and lower levels of burnout, in much the same way that Crawford et al. (2010) found that job resources predicted low burnout and high work engagement.

Previous research has indicated that a lack of challenges on the job has been associated with boredom and job dissatisfaction (Burke, 1998) whereas a challenging job offers opportunities for personal growth and satisfaction (Bakker & Demerouti, 2007). Therefore we propose that individuals crafting a challenging job for themselves may also experience better well-being in terms of increased job satisfaction, work engagement and lower levels of burnout. Also Berg et al. (2010) suggested that crafting a challenging job may be an important pathway to increased job satisfaction. Podsakoff et al. (2007) found challenge demands to be positively related to job satisfaction. Crawford et al. (2010) found that challenging demands were related to high levels of work engagement but also to high levels of burnout, suggesting that challenging job demands may also be perceived as stressful. However, together with Tims et al. (2012) we argue that individuals will only engage in job crafting to increase challenging job demands that they appraise to be beneficial for them.

In summary, we argue that job crafting that aims to increase job resources and challenging demands and minimize hindering demands will be positively related to work engagement and job satisfaction and negatively related to burnout (Hypothesis 2).

Method

Design
The study employed a longitudinal survey design. Time 1 and Time 2 data were collected with a 12-month interval and included information on job crafting
behaviours related to various job demands and job resources and on well-being outcomes including burnout, work engagement and job satisfaction.

**Participants**

The sample consisted of mail delivery workers in the Danish postal service. At Time 1, questionnaires were distributed to 405 staff and 362 questionnaires were returned, yielding a response rate of 89%; 45% were female, the average age was 44.6 (SD = 11.8) and they had been at the workplace on average 16 years (SD = 11). At Time 2 the questionnaire was distributed to 466 staff and 408 returned the questionnaire, yielding a response rate of 88%; 45% were female and the average age was 43 (SD = 12.8) and they had on average been at the workplace for 15.4 years (SD = 11.1). In total 284 participants provided data at both Time 1 and Time 2. Of these, 46% were female. The mean age was 44.5 (SD = 11.4) and they had on average been 16.4 years (SD = 10.8) at the workplace (at Time 1). The demographic data (age and gender) of the sample that provided data at both Time 1 and Time 2 were compared to organizational records and the participant group was found to be representative of the population from which it was drawn. Analyses testing for systematic dropout from Time 1 to Time 2 revealed no significant differences between those who only responded at Time 1 to those who responded both times in terms of gender, tenure, age and well-being outcomes.

**Development of the job crafting scales**

We followed the guidelines recommended by Hinkin (1998) in developing scales. First, we specified the domains to be included (we assumed these to be the same as found by Tims et al., 2012). Then we selected items from the existing job crafting measure (Tims et al., 2012), either keeping items or adapting existing items to blue-collar workers to assess each domain, and finally, we determined the extent to which items measured the specific domains. Two sources of information were used to design the job crafting scales. As a first source we included the items from Tims et al. (2012). (See Table 1 for an overview of which items were included from this scale and which were adapted based on interviews.) Second, we conducted a total of 34 individual interviews and six group interviews resulting in 54 interviewed employees (a total of 12% of employees in the sample were interviewed) using the cognitive mapping procedure (Harris, Daniels, & Briner, 2002). In cognitive mapping a visual representation of the working life of employees is developed. The interview guide consisted of questions about the sources of engagement and burnout, i.e. the positive and the negative aspects of their job as operationalized in the JD-R model (Bakker & Demerouti, 2007). Employees were then asked about which measures had been taken at different levels (individual, group, mid-managerial or organizational) to maximize job resources and challenging demands and minimize hindering demands. In each interview, the responses from the person being interviewed were written down on coloured sticky notes and placed on a large piece of paper. The responses were linked together with the problem/resource they addressed. During the course of the interview a map of perceived working conditions and improvement attempts (including job crafting behaviours) was thus produced. The reported behaviours at the individual level were analysed using content analysis (Krippendorff, 2004) to
Table 1. Factor structure of job crafting measure. Exploratory factor analysis loadings on factors 1 to 5. (Confirmatory factor analysis loadings are in parentheses).

| Scales and constituent items | Mean (SD) | Item-total correlation | Communalities | 1 | 2 | 3 | 4 | 5 |
|-----------------------------|-----------|------------------------|---------------|---|---|---|---|---|
| **Increasing challenging job demands** $\alpha = .85$, variance explained = 25.70% | | | | | | | | |
| I regularly take on extra tasks even though I do not receive extra salary for them$^a$ | 3.00 (1.18) | .67 | .69 | .82 |
| When a new task comes up I sign up for it$^b$ | 2.64 (1.26) | .77 | .79 | .89 |
| When there is an opportunity to get involved I seize it$^b$ | 2.54 (1.05) | .78 | .80 | .87 |
| When new methods are introduced I am one of the first to hear about them and test them$^b$ | 2.73 (1.12) | .57 | .53 | .72 |
| **Decreasing social job demands** $\alpha = .76$, variance explained = 15.34% | | | | | | | | |
| I try to avoid emotionally challenging situations with my customers$^b$ | 2.78 (0.89) | .48 | .50 | .79 |
| I manage my work so that I get as little contact as possible with my colleagues whose problems affect me emotionally$^a$ | 2.56 (0.95) | .47 | .62 | .65 |
| I manage my work so that I get as little contact as possible with my customers whose problems affect me emotionally$^b$ | 3.09 (0.93) | .55 | .67 | .78 |
| **Increasing social job resources** $\alpha = .75$, variance explained = 8.97% | | | | | | | | |
| I ask for feedback on my performance from my customers$^b$ | 2.65 (1.04) | .55 | .66 | .77 |
| I ask for feedback on my performance from my colleagues$^b$ | 2.77 (1.04) | .60 | .74 | .85 |
| I ask my supervisor whether s/he is satisfied with the work I do$^a$ | .58 | .67 | .80 |

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Table 1 (Continued)

| Scales and constituent items                                      | Mean (SD) | Item-total correlation | Communalities | 1   | 2   | 3   | 4   | 5   |
|-------------------------------------------------------------------|-----------|------------------------|----------------|-----|-----|-----|-----|-----|
| **Increasing quantitative job demands** $\alpha = .74$, variance explained = 8.46% |           |                        |                |     |     |     |     |     |
| When there isn’t much to do I offer my help to colleagues         | 3.49 (0.90) | .55                    | .65            | .79 |     |     |     | (.73) |
| When there isn’t much to do I see it as an opportunity to do things that need to be done (e.g. tidying up) | 3.70 (0.89) | .51                    | .65            | .77 |     |     |     | (.64) |
| I ask colleagues for their advice                                 | 3.45 (0.96) | .41                    | .61            | .74 |     |     |     | (.49) |
| **Decreasing hindering job demands**, inter-item correlation = .51, variance explained = 7.98% |           |                        |                |     |     |     |     |     |
| I ensure that my work is the least burdening/straining            | 3.58 (1.16) | .65                    | .79            | .86 |     |     |     | (.54) |
| I organize my work so I don’t get too stressed out                | 3.08 (1.13) | .65                    | .71            | .83 |     |     |     | (.92) |

Note: $N=341$ for EFA. *Items from Tims et al. (2012); bItems adapted from Tims et al. (2012) based on interviews.
identify behaviours related to minimizing hindering job demands and increasing challenging demands and job resources. The relevant job crafting behaviours were then transformed into statements that were included in the final questionnaire.

The results from the interview study indicated that two distinct kinds of social interaction took place: interaction with colleagues and interaction with customers. Social interaction with colleagues took place during coffee and lunch breaks and during short meetings, and with customers while out on the route, when mail was not delivered or delivered to the wrong address, or when delivering small parcels and letters of value. We therefore differentiated between these two types of social interaction when developing items.

A number of items in the Tims et al. (2012) questionnaire appeared to be less suitable in a blue-collar setting. First, some items concerned the opportunity to engage in, or initiate, new projects, i.e. reflect white-collar work (e.g. “When an interesting project comes a long, I offer myself as project co-worker” or “When there is not much to do at work, I see it as a chance to start new projects”), others were complicated in their wording (e.g. “When an interesting project comes along, I offer myself proactively as project co-worker”), referred to mental work (“I try to make my work more challenging by examining the underlying relationships between aspects of my job”) and others were ambiguous as to whether they referred to opportunities for training rather than job crafting behaviours in daily work (e.g. “I try to develop my capabilities” and “I try to develop myself professionally”). Furthermore, the majority of tasks in blue-collar settings are carried out in a standardized fashion (as described in O*Net [http://www.onetonline.org]). As a result, employees may experience limited opportunity for development and the items may mean little in a blue-collar context. These concerns were confirmed during discussions with the steering groups and through analysis of interviews. We therefore formulated questions that may be more relevant to a sample with little decision latitude and that did not refer to mentally challenging work to enhance the content validity and face validity of the measure (e.g. “When there isn’t much to do I offer to help my colleagues”, “When there isn’t much to do I see it as an opportunity to do things that need to be done, e.g. tidying up”, and “When there is an opportunity to get involved I seize it”).

The items were developed from the analysis of these two sources of information – the Tims et al. (2012) measure and the interviews – and are shown in Table 1. Overall, the tailoring to mail delivery workers was minimal, and the generic constructs can be readily identified from the items. In the phrasing of items we tried to avoid value-laden questions and used “never” to “very often” response categories to measure the respondents’ job crafting behaviours. It was an explicit aim of the questionnaire that as many scales as possible should include more than three items to support statistical analyses, while at the same time not making the scales overly complicated or long. We included items that we believed would cover the four dimensions of the Tims et al. (2012) questionnaire: increasing social job resources, increasing challenging job demands, increasing structural job resources and decreasing hindering demands, but we did not include many more items than Tims et al. (2012). A draft of the questionnaire was discussed with the steering groups (n = 24). They were asked to complete the questionnaire and were given the opportunity to discuss the relevance, redundancy and clarity of items including the suitability of items to their organization. Minor adjustments were made as a result of
this pilot study; only a few items were excluded as they were perceived to be too difficult to relate to work in a blue-collar sample (e.g. “I try to make my work more challenging by examining the underlying relationships between aspects of my job”). In total 22 items were included in the revised questionnaire, nine of which were taken directly from the Tims et al. (2012) questionnaire.

**Measures**
To test our second hypothesis we included measures of job satisfaction, work engagement and burnout.

*Job satisfaction.* This was measured using a single item: “How satisfied are you with your job as a whole, all in all?” The response categories were from 1 (Highly dissatisfied) to 5 (Very satisfied). Previous research has found that single-item measures of job satisfaction correlate highly with job satisfaction scales (Wanous, Reichers, & Hudy, 1997).

*Work engagement.* This was measured by a nine-item scale (Schaufeli, Bakker, & Salanova, 2006). An example of an item is: “At my work I feel bursting with energy” Response categories were from 1 (Never) to 6 (All the time). Cronbach’s alpha at Time 1 was .93, and .92 at Time 2.

*Burnout.* This was measured by a seven-item scale (Kristensen, Borrtiz, Villadsen, & Christensen, 2005). An example of an item is: “Do you feel worn out at the end of the working day?”. Response categories were from 1 (Not at all) to 6 (All the time). Cronbach’s alpha at Time 1 was .86, and .84 at Time 2.

*Job crafting items* were presented to participants as statements about the individual’s job crafting behaviours on Likert-type scales: 1 (Never) to 5 (Very often).

As outcome scales and job crafting scales were measured on different response scales, these were transformed so they ranged from 0–100, with 100 representing a high (positive for job crafting, work engagement and job satisfaction and negative for burnout) score on the construct. This transformation did not affect the distribution of data or the relationships between variables and was done to enhance clarity in the interpretation and meaning of the results.

**Data analysis**
Descriptive data on the job crafting items were analysed to test for the presence or absence of significant skew or kurtosis at the item level: significant findings would indicate a bunching of participants’ responses, or lack of variance and imply a lack of sensitivity in the items. The existence, and discriminant validity, of different scales of job crafting (i.e. an aspect of the construct validity of its component scales) was examined using exploratory factor analysis (principal components analysis, with oblimin rotation) on Time 1 data (n = 362), with the solution being subjected to confirmatory factor analysis using LISREL 8.8 (Jöreskog and Sörbom, 1999) using the Time 2 data (n = 408). We expected to discover four factors that would exhibit
good discriminant validity replicating the findings of Tims et al. (2012) (Testing Hypothesis 1). We also speculated that these factors would be orthogonal since the nature of job crafting suggests that job crafting scales could operate independently of each other. The internal reliability of the scales was then examined and the discriminant validity of the various sub-scales was further tested by examining correlations between scales (Table 2). The acceptable levels of fit used to assess the adequacy of each model were according to the recommendations made by Anderson and Gerbing (1988). NNFI (non-normed fit index), AGFI (adjusted goodness of fit index), CFI (comparative fit index) should be above .90 and RMSEA (root-mean-square error of approximation) should be below .08 for a good fit and below .05 for an excellent fit of the model to the data.

Before testing the criterion-related (concurrent) validity of the job crafting scales, structural equation modelling was used to test whether the relationships between job crafting scales and well-being outcome measures might be explained by common method variance (and hence provide a further test of the discriminant validity of the scales). The concurrent validity of each of the job crafting scales was tested by examining the relationships between each scale at Time 1 and Time 2 well-being outcomes measures through (1) correlational analysis and (2) regression analysis. Participants who provided data at both Time 1 and Time 2 were included in the regression analyses after the pairwise deletion of missing variables.

Results

Sensitivity of the job crafting scales

Hypothesis 1, stating that we expected to find a similar four-factor scale structure to that of Tims et al. (2012) was rejected. Factor analyses revealed five factors: the content of these scales differed from that of the content in Tims et al. (2012). None of the five job crafting scales, or the items within them, exhibited significant skew or kurtosis. After factor analyses, a mean item score was calculated for each job crafting scale. Table 1 shows that for the majority of items, means were around or below the scale mid-points.

The job crafting behaviours most often engaged in were Decreasing hindering job demands (mean = 59.82 at Time 1 and 61.46 at Time 2, out of a possible 100) and Increasing quantitative job demands (mean = 55.13 at Time 1 and 57.03 at Time 2, out of 100). The job crafting behaviours least often engaged in were Increasing social job resources (mean = 21.52 at Time 1 and 22.84 at Time 2, out of 100) and Decreasing social job demands (mean = 27.63 at Time 1 and 28.62 at Time 2, out of 100). This distribution of scores shows that there was substantial variability in job crafting behaviours and provides some preliminary support for the scales being sensitive to different types of job crafting behaviours.

Discriminant validity of the scales: Structure of the job crafting measure

Early iterations of the factor analysis resulted in the removal of seven cross-loading job crafting items from any further analysis. Later inspection of these items revealed that the wording of each of these seven items reflected the content of more than one of the final job crafting scales. Exploratory factor analysis of the job crafting items
| Scale | M    | SD   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
|-------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. Increasing challenging job demands T1 | 43.32 | 23.75 |     |     |     |     |     |     |     |     |     |
| 2. Decreasing social job demands T1   | 27.63 | 19.94 | .00 |     |     |     |     |     |     |     |     |
| 3. Increasing social job resources T1 | 21.52 | 20.62 | .28** |     |     | .23** |     |     |     |     |     |
| 4. Increasing quantitative job demands T1 | 55.13 | 20.53 | .39** | -0.01 |     | .29** |     |     |     |     |     |
| 5. Decreasing hindering job demands T1 | 59.82 | 22.41 |     | .17* |     | .20** | .15* |     | .09 |     |     |
| 6. Increasing challenging job demands T2 | 42.52 | 24.21 | .77** |     | .02 | .25** | .34** |     | .11 |     |     |
| 7. Decreasing social job demands T2   | 28.62 | 21.12 |     |     | .49** | .18** | .02 |     | .11 |     | .00 |
| 8. Increasing social job resources T2 | 22.84 | 22.33 |     | .21** | .17* | .55** | .29** | .01 | .42** |     | .23** |
| 9. Increasing quantitative job demands T2 | 57.01 | 19.18 | .29** |     | .06 | .21** | .60** | .10 | .36** | .08 | .36** |
| 10. Decreasing hindering job demands T2 | 61.46 | 21.37 |     | .27* |     | .17* | .22** | .47** | .38** | .14* | .12 | .26** |

Note: N = 384. Test-retest correlations on the sub-diagonal are underlined.  
* p < .05, ** p < .01.
indicated that the remaining 15 items in the measure could be represented in a
simpler structure (KMO = .80; Bartlett’s Test of Sphericity \( p < .001 \)). The rotated
solution produced five orthogonal factors (explaining 66.44% of the variance in the
data). Confirmatory factor analysis conducted on the follow-up sample indicated an
acceptable fit of the five-factor model to the data: \( \chi^2 (80, N = 341) = 245.67, \ p > .05, \)
RMSEA = .06; NNFI = .93; CFI = .95; AGFI = .91. To confirm the factor structure
we also tested a one-factor model where all items were set to load on one factor
(ruling out common method bias; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).
This model had a poor fit to the data \( \chi^2 (90, N = 341) = 941.87, \ p < .001, \)
RMSEA = .14; NNFI = .72; CFI = .76; AGFI = .71. The fit of the one-factor model
to the data was significantly worse than the five-factor model, \( \Delta \chi^2 (df = 10, N =
341) = 696.20, \ p < .001. \) Therefore the five-factor model was accepted and the factors
were labelled according to their item content.

Table 2 shows that the inter-correlations between the job crafting scales were
modest, indicating that the scales exhibited discriminant validity. The highest
correlations were between increasing challenging demands and increasing quantita-
tive demands \( (r = .39; \ p < .01) \) and between increasing quantitative demands and
increasing social job resources \( (r = .29, \ p < .01) \). The items within each of the five
factors (with their loadings from the CFA) are listed in full in Table 1.

The five identified factors and their psychometric characteristics are as follows:

*Increasing challenging demands* (four items). These items examined the individual’s
crafting to engage in new activities, e.g. “When a new task comes up I sign up for it”.
Cronbach’s alpha = .85. This factor explained 25.70% of the variance of the data.

*Decreasing social demands* (three items). These items measured the individual’s active
attempts to avoid emotionally challenging situations, e.g. “I try to avoid emotionally
challenging situations with my customers”. Cronbach’s alpha = .76. This factor explained
15.34% of the variance of the data.

*Increasing social job resources* (three items). These items measured the individual’s job
crafting to maximize feedback from the social context, e.g. “I ask for feedback on my
performance from my customers”. Cronbach’s alpha = .75. This factor explained 8.97%
of the variance of the data.

*Increasing quantitative demands* (three items). These items measured the individual’s active
tries to create more work for him or herself, e.g. “When there isn’t much to do
I offer my help to colleagues”. Cronbach’s alpha = .74. This factor explained 8.46% of
the variance of the data.

*Decreasing hindering demands* (two items). These items measured the individual’s active
attempts to organize work such that it was the least stressful, e.g. “I ensure that my work
is the least burdening/straining”. Inter-item correlation = .51. This factor explained
7.98% of the variance of the data.

**Test-retest reliability: Stability of measures over time**

Correlation coefficients were calculated to estimate the test-retest reliability of the
Time 1-Time 2 scores (see Table 2). The correlations for the five scales were: Increasing
challenging job demands, \( r = .77; \) Decreasing social job demands, \( r = .49; \) Increasing
social job resources, \( r = .55; \) Increasing quantitative job demands, \( r = .60; \) Decreasing
Table 3. Descriptive statistics and intercorrelations between scales.

| Scale                                      | M    | SD   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |
|--------------------------------------------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. Increasing challenging job demands (T1)| 43.32| 23.75|     |     |     |     |     |     |     |     |
| 2. Decreasing social job demands (T1)     | 27.63| 19.94| .00 |     |     |     |     |     |     |     |
| 3. Increasing social job resources (T1)   | 21.52| 20.62| .28**| .23**|     |     |     |     |     |     |
| 4. Increasing quantitative job demands (T1)| 55.13| 20.53| .39**| -.01 | .29**|     |     |     |     |     |
| 5. Decreasing hindering job demands (T1)  | 59.82| 22.41| .17**| .20**| .15* | .09 |     |     |     |     |
| 6. Burnout (T2)                            | 20.53| 16.37| -.19*| .08  | -.07 | -.14*| -.11|     |     |     |
| 7. Engagement (T2)                         | 66.39| 15.86| .37**| .09  | .24**| .36**| .02 | -.45**|     |     |
| 8. Job satisfaction (T2)                   | 80.80| 15.40| .20**| .02  | .22**| .22**| .02 | -.48  | .66**|     |

Note: $N=384$. Only correlations employed in hierarchical regression analyses are reported here. Full correlations can be obtained upon request from the authors. * $p<.05$, ** $p<.01$. 
Table 4. Summary of hierarchical regression analysis of the relationships between job crafting scales and well-being outcomes.

| Independent variables                                      | Engagement | Job satisfaction | Burnout |
|------------------------------------------------------------|------------|-----------------|---------|
|                                                            | B         | SE B   | β    | B    | SE B  | β  | B    | SE B  | β   |
| Step 1                                                     |           |         |      |      |         |    |      |         |     |
| Increasing challenging job demands T1                     | .14       | .04    | .21**| .00  | .00   | .07 | -.08 | .05    | -.12|
| Decreasing social job demands T1                          | .05       | .05    | .06  | .00  | .00   | .01 | .09  | .05    | .12 |
| Increasing social job resources T1                        | .08       | .05    | .10  | .01  | .00   | .14*| .01  | .05    | .02 |
| Increasing quantitative job demands T1                    | .18       | .05    | .24***| .01  | .00   | .17*| -.07 | .05    | -.09|
| Decreasing hindering job demands T1                       | -.04      | .04    | -.05 | .00  | .00   | -.07| -.09 | .05    | -.12|
|                                                            |            | R² = .41 | N = 256 | R² = .28 | N = 257 | R² = .25 | N = 251 |

Note: * p < .05; ** p < .01; *** p < .001.
hindering job demands, $r = .47$. All five correlations exceeded the extensive criterion (second highest standard) of a correlation greater than .40 for a minimum of three months between data collection points (Robinson, Shaver, & Wrightsman, 1991). The correlations suggest that the scores are somewhat variable over time.

**Predictive validity: Relationships between the job crafting scales and well-being outcomes**

Our second hypothesis, stating that job crafting behaviours would be positively related to work engagement and job satisfaction and negatively related to burnout, was partially confirmed. Table 3 shows that seven out of the 15 possible correlations between the five job crafting scales and the three well-being scales were significant at $p < .05$ after Bonferroni correction ($p < .01$). Increasing challenging demands and Increasing quantitative job demands (both Time 1) were found to have the strongest correlation with work engagement Time 2 ($r = .37; p < .01$ and $r = .36; p < .01$, respectively) but also correlated with job satisfaction ($r = .20; p < .01$ and $r = .22; p < .01$, respectively) and burnout ($r = -.19; p < .01$ and $r = -.14; p < .01$, respectively). Furthermore, Increasing social job resources were associated with work engagement and job satisfaction ($r = .24; p < .01$ and $r = .22; p < .01$, respectively). Decreasing social job demands and Decreasing hindering job demands were not related to any of the outcomes.

Next, we conducted longitudinal hierarchical regression analyses. For job satisfaction Time 2, we found that the $\beta$ value for Increasing quantitative job demands was $\beta = .17$ ($p < .05$) and for Increasing social job resources it was $\beta = .14$ ($p < .05$). These Beta weights, together with a correlation of $r = .29$ ($p < .01$) between these two job crafting scales, indicated that the two scales explained a unique portion of the variance in Time 2 job satisfaction. The job crafting scales Increasing challenging job demands and Increasing quantitative job demands both explained a significant proportion of unique variance in Time 2 work engagement ($\beta = .21, p < .01; \beta = .24, p < .01$, respectively). These $\beta$ values, together with a correlation of $r = .39$ ($p > .01$) between these job crafting scales, indicated that they each explained unique variance in Time 2 work engagement. In all cases Beta weights indicated that job crafting behaviours were associated with higher Time 2 levels of job satisfaction and work engagement, and lower burnout. Decreasing social job demands and Decreasing hindering job demands did not predict any of the outcomes. Table 4 shows the results of the regression analyses.

When subjected to regression analyses controlling baseline measures of well-being, none of the job crafting scales remained significantly associated with the Time 2 well-being measures. This indicates that a large proportion of the variance in outcome measures explained by job crafting was also explained by baseline variance in well-being. This interpretation is supported by regression analyses without controlling for Time 1 well-being levels.

**Discussion**

In this study we set out to design and validate a measure for the job crafting behaviours of blue-collar workers. We found support for our second hypothesis, that
blue-collar workers engage in job crafting behaviours, and that these were linked, although not strongly, to well-being outcomes. As such our study contributes to the growing literature on job crafting in occupational health psychology (Tims & Bakker, 2010; Tims et al., 2012). Our factor analyses show that blue-collar workers’ job crafting behaviours can be measured using five scales. In each of these factors there was substantial between-participant variability in job crafting. Interviews were used to tailor an existing questionnaire (Tims et al., 2012) to blue-collar workers. Across a number of indices, the fit of the five-factor job crafting model to the data was acceptable. To date, the research on job crafting using quantitative measures is limited, and the scales presented here add to our knowledge of the job crafting behaviours in which blue-collar workers engage.

Hypothesis 1 was rejected. That is, our scale structure differed from the Tims et al. (2012) questionnaire. We found five rather than four dimensions. We found two scales on decreasing demands: Decreasing social job demands and Decreasing hindering job demands. Contrary to expectations (Tims et al. (2012) only found a scale on increasing social job resources) we found that social interaction was both a resource and a demand. A possible explanation for the discrepancy in scale structure may be that mail delivery workers in interviews reported their colleagues as both a positive (social support) and a negative aspect of work (a diverse workforce with different needs and goals at work). Mail delivery workers also reported having both positive and negative experiences with customers, e.g. receiving complaints but also experiencing customers’ positive reaction when receiving presents or good news. Our results are in accordance with the literature on emotional labour (Zapf, 2002) and social support (House, 1981), suggesting that social interactions in the workplace may be both positive and negative.

The lowest scores were found for scales concerning social interaction – increasing social job resources and decreasing social job demands. A possible explanation may be that participants experience little decision latitude with regards to whom they work with and as a result they experience fewer opportunities for job crafting to manage social interaction. Data from a large Danish national representative survey (the Danish Work Environment Cohort Study – DWECS) suggest that mail delivery workers experience fewer opportunities for deciding with whom they work (DWECS, 2010).

We found no support for the scale “Increasing structural job resources”. We did include items on this measure (although fewer than Tims et al., 2012), however, after conducting factor analyses these were excluded (e.g. “I decide on my own how I do things”). One possible explanation for the failure to replicate this scale may be that blue-collar workers have fewer opportunities to influence work at higher levels, make full use of their skills at work, or affect the structural aspects of the job. The limited influence of blue-collar workers compared to professionals is well documented (Karasek & Theorell, 1990). Another explanation may be that items do not directly relate to behaviours, but could rather be seen as a job characteristic, i.e. autonomy.

Contrary to Tims et al. (2012), two factors concerning workload were identified in our analyses. Increasing quantitative job demands concerned behaviours that employees engage in to create more work for themselves. According to activation theory (Scott, 1966) a certain level of activity is needed to activate the individual (DeRue & Wellman, 2009) and poor well-being may be the result of a job where employees are inactive (Karasek & Theorell, 1990). This dimension differed from the dimension “Increasing challenging job demands” in that the latter focused on
initiating new activities whereas “Increasing quantitative job demands” focused on increasing the amount of existing activities. The Increasing challenging demands scale was similar to the scale identified by Tims et al. (2012).

The finding that three out of five job crafting scales showed some relationship to well-being outcomes (Tables 3 and 4) indicates that job crafting behaviours may over time have a significant influence on employee well-being (partially confirming Hypothesis 2). Interestingly, it would appear that job crafting to increase job demands and job resources (Increasing challenging job demands, Increasing social job resources, and Increasing quantitative job demands) showed the strongest relationships to well-being outcomes.

We found no relationship between the scales concerning Decreasing (social or hindering) job demands and well-being outcomes. There may be several explanations for this finding. First, Decreasing demands job crafting may be seen more as an avoidance or distancing coping strategy rather than a proactive behaviour, i.e. that employees seek to avoid situations they perceive stressful rather than try to get something positive out of the situation. Previous research has found avoidance and distancing coping behaviours to be the least effective (Lazarus & Folkman, 1992; Lazarus, 1993), particularly if they are not combined with attempts to control the situation (Snow, Swan, Raghavan, Connell, & Klein, 2003). Second, it is possible that the scales are linked to other outcomes not measured here that are more closely related to avoidance behaviours, e.g. intention to leave or sickness absence. Third, it may be that employees accept the current type and level of social interaction as a condition that is difficult to change as they have little influence over social interaction. This explanation was supported by interviews. Although employees reported sensitive social relations as a problem they reported this to be an annoyance rather than an issue that severely impacted on their well-being at work. Future research should explore these kinds of job crafting in further detail, linking them to other aspects of well-being and using other samples.

Our results indicated that controlling for baseline outcome measures, job crafting measures did not predict outcomes over time. It would appear that baseline well-being measures explain the same proportion of well-being as job crafting behaviours. It is also possible that the relatively weak relationships between job crafting behaviours and well-being may be explained by the 12-months’ follow-up – the effects of behaviours may be more immediate. Daniels (2011) argued that some job crafting may take place over short periods of time with immediate effects, whereas other job crafting behaviours may have a long-term impact (e.g. renegotiating job content with superiors). Future research should examine the relationships between job crafting behaviours and well-being outcomes over shorter periods of time, e.g. using diary methods.

**Strengths and limitations**

The main strengths of this study are the longitudinal design, allowing us to assess test-retest reliability and examine the effects of job crafting on well-being outcomes over time, and the multiple source information used in developing our scales (i.e. an existing measure, interviews, and discussions with organizational members). Our scales were short, only one consisted of four items, three scales consisted of three items and one was a two-item index. Such short scales may be advantageous in occupational groups...
with little or no education. Likewise, short, reliable and valid scales are useful for human resources and occupational health practitioners interested in measuring job crafting. In our study, Cronbach’s alphas were satisfactory.

However, the study also has a number of limitations which must be considered. First, in this study we only included one occupational group: mail delivery workers. It is possible that our questions are only relevant to this group of blue-collar workers. Some blue-collar workers may not have direct contact with customers, e.g. workers at the production line. However, we would argue that many blue-collar workers have some type of customer contact, e.g. construction workers encounter people around the construction site, and cleaning staff have contact with the customers whose premises are cleaned. Therefore, we propose that the majority of constructs could be relevant across a range of blue-collar jobs with a certain amount of customer contact. Also, the opportunities for development, social support, emotional demands and quantitative demands did not differ significantly from those of other blue-collar workers, e.g. skilled and unskilled industrial workers and cleaners in a representative sample of the Danish working population (DWECS, 2010). Furthermore, we only collected data in one sample. Therefore we were not able to test exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in separate samples. We tested EFA on our baseline data and CFA on our follow-up data to get as different a sample as possible; however, the number of participants that responded both times was high. The reliability and validity of the scales should be re-examined to test the structure and psychometric properties in new settings.

Conclusion

The contribution of this study is three-fold. First, we were able to confirm the results of previous qualitative research: that is, that blue-collar workers engage in job crafting behaviours. Second, we extended and validated an existing questionnaire on job crafting behaviours, adapting it to a blue-collar context. Third, we identified the types of job crafting behaviours which over time were linked to well-being outcomes. It is our hope that this study may inspire researchers to investigate job crafting behaviours in blue-collar workers and that this will increase awareness of job crafting behaviours in highly standardized low-control jobs. Furthermore, increasing our understanding of how and why blue-collar workers job craft may help managers and occupational health practitioners encourage such behaviours and thereby increase their employees’ health and well-being.

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