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## Validating the Job Crafting Questionnaire (JCRQ): A multi-method and multi-sample study

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### ABSTRACT

Job crafting presents a set of proactive behaviours in which employees may engage to alter the job content or their relations with others at work. In recent years, several measures have been developed to capture job crafting. In the present study, we test the validity and reliability of an existing Job Crafting Questionnaire (the JCRQ) in four studies: first, we test the scale validity of the JCRQ in a Spanish diary study (Spain,  $N = 164$ , diary occasions 820). Second, we test the scale validity across two Western (Spain,  $N = 164$  and UK,  $N = 109$ ) and two Eastern cultures (China,  $N = 170$  and Taiwan,  $N = 165$ ). Third, we test the test–retest reliability in a Spanish three-wave longitudinal sample ( $N = 191$ ). Finally, we test the criterion validity using data from the four countries. Results confirm the presence of five independent job crafting dimensions: increasing challenging demands, decreasing social job demands, increasing social job resources, increasing quantitative demands and decreasing hindrance job demands. The JCRQ shows acceptable test–retest reliability, scale and criterion validity across the four studies.

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Multi-method; job crafting; validation; questionnaire; job demands-resources model; multi-sample

## Introduction

Organisations increasingly expect employees to act on information and react to unusual circumstances, thus demonstrating proactive behaviours (Erdogan & Bauer, 2005). Proactive employees construe their roles more broadly, and they redefine their jobs to include new tasks and goals (Belschak & Den Hartog, 2010; Berg, Wrzesniewski, & Dutton, 2010). Job crafting is one such proactive behaviour where employees mobilise resources to fulfil their needs and thrive at work (Bakker & Demerouti, 2007). 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). To date, job crafting has been found to be beneficial for employees’ well-being and organisational performance (e.g. Bakker, Tims, & Derks, 2012; Leana, Appelbaum, & Shevchuk, 2009; Tims, Bakker, & Derks, 2013). In the present study, we validate an existing questionnaire on job crafting

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to explore its validity across a range of occupational and national contexts and using different methods (survey and diary studies).

The work of Wrzesniewski and Dutton (2001) has stimulated both qualitative and quantitative research on how employees may job craft to change the boundaries of their job and the consequences of doing so. A substantial body of the quantitative research on job crafting has explored the concept within the framework of the job demands-resources (JD-R) model (e.g. Tims & Bakker, 2010; Tims, Bakker, & Derks, 2012). Specifically, the JD-R model suggests that high job demands and low job resources lead to a misfit between the person and the job. It is assumed that employees initiate job crafting behaviours to “adjust” this misfit through managing the resources and/or demands of the job better. Such job crafting should lead to higher satisfaction, performance and overall well-being (Tims & Bakker, 2010). Tims et al. (2012) developed and validated a measure of job crafting behaviours identifying four scales of job crafting behaviours aimed at decreasing hindrance job demands, increasing social job resources, increasing challenging job demands and increasing structural job resources. Based on LePine, Podsakoff, and LePine (2005), Tims and Bakker (2010) distinguished between hindrance demands (demands that are perceived stressful, such as working with the wrong materials) and challenging demands (such as task complexity) proposing that decreasing hindrance demands and increasing challenge demands might both lead to positive outcomes for the employee (e.g. enhanced well-being) and for the organisation (e.g. in-role and extra-role performance).

Based on Tims et al. (2012), Nielsen and Abildgaard (2012) developed a questionnaire exploring five job crafting behaviours, the Job Crafting Questionnaire (JCRQ). The JCRQ include the dimensions of increasing challenging demands, decreasing hindrance job demands, increasing social job resources, decreasing social job demands and increasing quantitative demands. Nielsen and Abildgaard (2012) argued that seeking structural resources involve a very high level of decision-making latitude (e.g. to initiate new projects) and may thus not be relevant among blue collar workers with fewer degrees of freedom. Furthermore, they found two dimensions of job crafting social relations: increasing social job resources, which relate to seeking support and feedback and decreasing social job demands which concerns minimising contact with people. This latter dimension has its theoretical foundation in emotional labour, that is, the emotional demands employees are faced with in the job (Brotheridge & Grandey, 2002) and interpersonal conflicts at work (Wall & Callister, 1995). Nielsen and Abildgaard (2012) also distinguished between job crafting challenging demands that refers to individuals taking on new tasks that may create a challenging job thus crafting a qualitatively different job whereas job crafting quantitative demands refers to individuals doing more of what they are already doing and thus capturing a quantitative dimension of increasing job demands.

In the present study, we validate the Nielsen and Abildgaard (2012) JCRQ and test its applicability in four studies. Five samples were used: a diary study in a Spanish sample and survey data samples in Spain, UK, China and Taiwan. The four studies tested: scale validity of the JCRQ in a diary study (Study 1); the validity of the JCRQ across cultural contexts (Study 2); test-retest reliability (Study 3) and criterion validity: relationships between the job crafting scales and well-being (Study 4).

We fill several gaps in the existing validation literature on job crafting. First, the original questionnaire by Nielsen and Abildgaard (2012) was developed for use in blue collar workers, however, an inspection of the items included in the questionnaire suggests that the

questionnaire may be applicable to a wider sample of employees, not just blue collar workers. In the present study, we test the validity in different samples with employees at different educational levels. Second, we explore the temporal and dynamic nature of job crafting. We test whether a questionnaire developed for use in surveys can be transferred to diary studies. If this is the case, we are able to draw conclusions of the between- and within-person patterns of job crafting. Third, we test whether the JCRQ can reliably be used in different cultural contexts. We move beyond the Northern European context and validate the questionnaire in other Western European countries, namely Spain and the UK, and two Asian countries, Taiwan and China. Finally, job crafting has been found to be related to performance and job satisfaction and we seek to replicate these findings using the JCRQ. For an overview of existing measures of job crafting and their use, we refer to [Table 1](#).

### Study 1: validating the JCRQ as a diary method

Recently, job crafting has been measured in diary studies to capture within-person variations of job crafting. Diary studies have been recommended to collect work and non-work experiences in individuals' natural life contexts (Ohly, Sonnentag, Niessen, & Zapf, 2010). These experiences may take place during the course of a working week, or during longer time frames such as weeks or months. This innovative methodology reduces the likelihood of retrospective recall bias because the amount of time between the experience and the report of these experiences is reduced (Bolger, Davis, & Rafaeli, 2003). Job crafting has been studied in diary studies (Petrou, Demerouti, Peeters, Schaufeli, & Hetland, 2012; Tims, Bakker, & Derks, 2014) but it remains to be examined whether the items included in the JCRQ will have a similar factor structure on different days. Based on the previous validation of Petrou et al. (2012), who found a similar structure at the within- and between-levels of analysis, we predict that the Nielsen and Abildgaard (2012) five-factor model will present the best fit to the data at both between- and the within-person level. We tested this in Study 1.

*Hypothesis 1:* The state version of the job crafting scale will show a five-factor structure at the within- and between-person levels, i.e. increasing challenging demands, decreasing social job demands, increasing social job resources, increasing quantitative demands and decreasing hindrance job demands.

It has been demonstrated in previous daily validations measuring other constructs than job crafting that factor loadings tend to be lower at the day level as compared to the between-person level (e.g. Bakker, Sanz-Vergel, Rodriguez-Muñoz, & Oerlemans, 2015; Petrou et al., 2012). The explanation for these low factor loadings at the day level is that certain behaviours (such as job crafting) may fluctuate from day to day. For example, one can increase quantitative demands one day when there is not much to do, but the next day when more work is assigned there may be little possibility and/or need to increase quantitative demands on that day. The same can be applied to other dimensions of job crafting (e.g. opportunities to increase challenging demands may not be present every day). In general surveys, employees indicate general levels of job crafting, so responses are aggregated and the average experience is reported. For that reason, factor loadings tend to be higher at the between-level of analysis. Also tested in Study 1, we hypothesise that:

**Table 1.** Overview of existing job crafting measures.

Authors/year	Theoretical background	Job crafting dimensions	Sample	Validated in other countries	Used in other countries	Between- and within- person validation
Ghitulescu (2006)	Wrzesniewski and Dutton (2001)	Task job crafting Cognitive job crafting Relational job crafting	70 employees in 21 teams (manufacturing) in US	No	No	No
Leana et al. (2009)	Wrzesniewski and Dutton (2001)	Task crafting Relational crafting Cognitive crafting	232 teachers in US	Four items used by Slemp and Vella-Brodrick (2013)	Taiwan (Chen et al., 2014)	No
Lu, Wang, Lu, Du, and Bakker (2014)	Laurence (2010)	Physical job crafting Relational job crafting	246 employees in foreign-owned technology firm	No	No	No
Nielsen and Abildgaard (2012)	Tims and Bakker (2010)	Increasing challenging demands Decreasing social job demands Increasing social job resources Increasing quantitative demands Decreasing hindrance job demands	Postal service workers (N = 362 at Time 1; N = 408 at Time 2) in Denmark	Present study: China, Taiwan, UK, Spain	Present study	Yes, present study
Petrou et al. (2012)	Tims and Bakker (2010)	Seeking resources Seeking challenges Reducing demands	95 employees in The Netherlands (5-day diary study)	No	No	Same structure across the two levels
Sekiguchi et al. (2014)	Wrzesniewski and Dutton (2001)	Task crafting Relational crafting Cognitive crafting	509 students with part-time job and 594 employees in Japan	No	China (Li, Sekiguchi, & Qi, 2014)	No
Slemp and Vella-Brodrick (2013)	Wrzesniewski and Dutton (2001)	Task crafting Relational crafting Cognitive crafting	334 employees from Australia	No	No	No
Tims et al. (2012)	Tims and Bakker (2010)	Increasing structural job resources Increasing social job resources Increasing challenging job demands Decreasing hindrance job demands	Three separate studies conducted in The Netherlands (total N = 1181).	Structure replicated in Turkey: Akin, Sariçam, Kaya, and Demir (2014). Spain: Ficopal-Cusí et al. (2014) Iran: Golparvar and Rezaie (2014)	Egypt (Shusha, 2014) India (Siddiqi, 2015)	Subscale used in diary study (Tims et al., 2014)



*Hypothesis 2:* The factor loadings of the five dimensions will be lower on the day- or within-person level as compared to the general or between-person level.

## Study 2: validating the JCRQ across different cultures

Most quantitative studies of job crafting have been carried out in the Netherlands (Petrou et al., 2012; Tims et al., 2012, 2014; Tims, Bakker, Derks, et al., 2013; Tims, Bakker, Derks, & Van Rhenen, 2013); only a few studies have been conducted in Asia (Chen, Yen, & Tsai, 2014; Sekiguchi, Li, & Hosomi, 2014) and in other countries such as Spain, Turkey or Egypt (Akin et al., 2014; Ficapal-Cusí, Torrent-Sellens, Boada-Grau, & Hontangas-Beltrán, 2014; Shusha, 2014). To the best of our knowledge, few job crafting measures have been validated in different cultural contexts to compare whether the factor structure remains the same. Most studies on quantitative job crafting based on the JD-R model have been conducted in the Netherlands, that is, Northern Europe. In the present study we compare four countries where the JCRQ has not previously been used. In Europe, we tested the JCRQ in Spain and the UK, representing continental and non-continental Europe.

We also selected two Asian countries to test whether the JCRQ is transferable to the Asian context. To the best of our knowledge, no measures of job crafting based on the JD-R model have been used in an Asian context. Thus, we examine the structure of the JCRQ across diverse cultural contexts and different professional backgrounds, allowing us to examine the generalisability of this measure. We tested this in Study 2. We expected the following:

*Hypothesis 3:* The five-factor structure (increasing challenging demands, decreasing social job demands, increasing social job resources, increasing quantitative demands and decreasing hindrance job demands) will be confirmed in China, Spain, Taiwan and the UK.

## Study 3: testing the stability of the JCRQ

The underlying assumption of questionnaires is that they capture stable constructs that are consistent over time and reflect employees' aggregated behaviours (Nielsen & Cleal, 2010). In order to test the stability of employees' general job crafting behaviours we explored test-retest reliability. The stability of the JCRQ has been confirmed over two time points (Nielsen & Abildgaard, 2012). Replicating and extending the study of Nielsen and Abildgaard (2012), in Study 3, we explore the test-retest reliability of the JCRQ over three time points in a longitudinal sample. We hypothesised:

*Hypothesis 4:* The JCRQ will have high test-retest reliability over three time points.

## Study 4: job crafting and its relationship with well-being and performance

It is well-established that working conditions are closely related to burnout, work engagement and job satisfaction (Crawford, LePine, & Rich, 2010; Podsakoff, LePine, & LePine, 2007). Studying the associations between job crafting and well-being and performance outcomes is important to determine whether the degree to which employees engage in job crafting behaviours to change their working conditions is related to their well-being

and performance and is thus an essential step in the validation process. Previous studies have found a relationship between job crafting and well-being and performance (e.g. Bakker et al., 2012; Leana et al., 2009; Petrou et al., 2012; Tims, Bakker, Derks, et al., 2013). In the present study, we aim to confirm some patterns previously tested using the JCRQ as we explore the relationship between job crafting and job satisfaction using survey data from China, Spain, Taiwan and the UK. Using other job crafting measures, some studies have found relationships between job crafting and in-role performance (Ghitulescu, 2006; Leana et al., 2009; Tims et al., 2012, 2014) and extra-role performance (Slemp & Vella-Brodrick, 2013) and we test whether these relationships can also be confirmed for the JCRQ. We test these relationships in the samples from China, Taiwan and the UK in Study 4.

*Hypothesis 5:* Job crafting aiming to increase challenging demands, decrease social job demands, increase social job resources, increase quantitative demands and decrease hindrance job demands will be positively related to job satisfaction and in-role and extra-role performance.

## Methods: Samples 1–3

### *Procedure and participants*

We collected survey data from three independent samples in China, Taiwan and the UK (in one survey), and Spain. In Spain, diary data were collected in one sample and longitudinal survey data in another sample. In the following text we have described each sample separately. Because the original instrument was published in English, we translated the survey into Spanish and Chinese using back-translation (Brislin, 1980). The survey was first translated into the relevant languages by a bilingual speaker who was not familiar with the items. Another bilingual speaker back-translated the same items into English. This process did not give rise to major changes to any of the items. An overview of the samples can be obtained upon request from the first author.

### *Sample 1 procedure and participants*

The first sample was composed of Spanish employees from various occupational contexts working for different organisations. They completed both a diary study and a general questionnaire. To obtain access to these employees, students were asked to contact at least one employee who was willing to participate voluntarily in the study. In this way, heterogeneity of the sample and their jobs was secured (Demerouti & Rispens, 2014). Each participant received (a) a letter describing the purpose of the study and assuring anonymity of all responses, (b) instructions about the completion of the surveys, (c) a general questionnaire and (d) a diary booklet. The diary booklet had to be filled in over five consecutive workdays, twice a day (before leaving the workplace and before going to bed).

Of the 250 survey packages distributed, excluding participants who did not fill in the questionnaire on all days, 164 persons ( $N = 820$  occasions) responded to the general and daily questionnaires (66% response rate). Participants worked in a broad range of sectors, including health and welfare (22%), the catering industry (16%), trade (14%) and education (6%). Participation was voluntary.

### **Sample 2 procedure and participants**

In China, Taiwan and the UK, the survey was disseminated through Twitter, Facebook, personal networks, two university newsletters and LinkedIn. The Chinese sample consisted of 170 respondents, the Taiwanese sample consisted of 165 respondents and the UK sample had 109 respondents. We refer to this sample as Sample 2. To test Hypothesis 3 in Study 2, we merged the data from China, Taiwan and the UK with the 164 survey respondents in Sample 1.

### **Sample 3 procedure and participants**

The data for the test–retest hypothesis (Hypothesis 4) in Study 3 were collected in a Spanish private company that provides cleaning services to hotels. Data were collected over three waves with two months of time-lag between each data collection. We distributed questionnaires to 390 workers and received 309 complete questionnaires the first wave (response rate = 79%), 252 complete questionnaires the second wave (response rate = 65%) and 191 complete questionnaires the third wave (response rate = 49%). Participation was voluntary and anonymous. Each employee received instructions on how to generate a secret code that permitted us to track across the three waves.

### **Measures used in Samples 1–3**

The JCRQ (Nielsen & Abildgaard, 2012) was included in all three samples. It consists of five dimensions:

*Increasing challenging demands* (4 items). These items examine the individual's crafting to engage in extra activities, for example, "When a new task comes up I sign up for it."

*Decreasing social demands* (3 items). These items measured the individual's active attempts to avoid emotionally challenging situations, for example, "I try to avoid emotionally challenging situations with my customers/users of my work."

*Increasing social job resources* (3 items). These items measured the individual's job crafting to maximise feedback from the social context, for example, "I ask for feedback on my performance from my customers/users of my work."

*Increasing quantitative demands* (3 items). These items measured the individual's active attempts to create more work for him or herself, for example, "When there isn't much to do I offer my help to colleagues."

*Decreasing hindrance demands* (2 items). These items measured the individual's active attempts to organise work such that it is the least stressful, for example, "I ensure that my work is the least burdening/straining."

A full overview of items can be found in Nielsen and Abildgaard (2012). In the diary study, all items in the JCRQ were rephrased to measure job crafting behaviours on a daily basis. We decided to remove one item of the increasing challenging demands dimension in the diary study ("When new methods are introduced I am one of the first to hear about them and test them"), because we consider it unlikely that new methods are introduced on a daily basis. The instrument subsequently consists of 14 items which respondents would rate on a 5-point Likert scale (1 = Never and 5 = Very often).

To test criterion validity we included a range of outcomes. To avoid a lengthy questionnaire in the Spanish sample where respondents also completed the diary study, we only included job satisfaction (Sample 1). In China, Taiwan and the UK, we included job satisfaction, and in- and extra-role performance (Sample 2).

*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).

*In-role performance.* This was measured using three items from Goodman and Svyantek (1999). An example of an item is “I can always fulfill all the requirements of the job.” Response categories were from 1 (Strongly disagree) to 5 (Strongly agree). Cronbach’s alpha was .82.

*Extra-role performance.* This was measured using two sub-scales from Goodman and Svyantek (1999). The sub-scale altruism was measured by three items (example item: “I assist others with their duties”) and the sub-scale conscientiousness by three items (an example item: “I do not take unnecessary time off work”). Cronbach’s alpha for overall extra-role performance was .73.

## Data analysis

To test the psychometric qualities of the JCRQ, we decided to apply multiple techniques on several samples (DeVellis, 1991). In Study 1, we used confirmatory factor analysis (CFA) to test the validity of the five different job crafting scales. We expected to discover five factors that would exhibit good scale validity as described in Nielsen and Abildgaard (2012), testing Hypothesis 1. The internal reliability of the scales was then examined and the validity of the various sub-scales was further tested by examining correlations between items. Moreover, we expected to find higher factor loadings at the between-person level, testing Hypothesis 2, also tested in Study 1. Analyses were conducted with Mplus 6.12 (Muthén & Muthén, 2010), adjusting for the nested data structure using maximum likelihood estimation with robust standard errors (MLR), which appropriately adjusts standard errors and chi-square values. Our data have a multilevel structure, with repeated measurements nested within persons. It has been shown that some normality assumptions (e.g. homoscedasticity) pose a problem in multilevel designs. Therefore we used the MLR estimator in our analyses, which should lead to results that are robust to any effects of non-normality (Finney & Di Stefano, 2006).

We used various criteria to determine if models accurately fit the data and to compare them. Model chi-square ( $\chi^2$ ) was used to evaluate overall model-data fit. The models were compared using the Satorra–Bentler scaled chi-square difference test, which is recommended when using the MLR estimator (Satorra & Bentler, 2001). We also used the comparative fit index (CFI), the Tucker–Lewis Index (TLI), the root mean square error of approximation (RMSEA) and the standardised root mean square residual (SRMR) as guides in assessing fit. Values of .90 or higher for CFI and TLI, and .08 or lower for RMSEA and SRMR indicate a good fit of the model to the data (Hu & Bentler, 1999).

Testing Hypothesis 3 in Study 2, measurement invariance was conducted by multi-group CFAs using Mplus 6.12 (Muthén & Muthén, 2010), using four increasingly stringent levels outlined by Meredith (1993) and Vandenberg and Lance (2000). This

method employs successive analyses where constraints to the models are added consecutively; (1) configural invariance (all parameters are freely estimated in all samples but the underlying measurement structure is held constant across samples; (2) metric measurement invariance (factor loadings are invariant); (3) strong measurement invariance (invariance of factor loadings and item intercepts) and (4) strict measurement invariance (invariance of factor loadings, item intercepts and items). Although these tests require full invariance of all parameter estimates for all groups, Byrne, Shavelson, and Muthén (1989), and Marsh (2007) have pointed out the usefulness of a less demanding test of partial invariance in which a subset of parameters are not constrained to be invariant (e.g. configural and metric measurement invariance). In fact, invariance at the strict level is difficult to achieve (Clench-Aas, Nes, Dalgard, & Aarø, 2011).

To test Hypothesis 4 in Study 3, correlation coefficients were calculated to estimate the test-retest reliability of the Time 1–Time 3 scores using SPSS 23.

Criterion validity refers to the extent to which a scale is related to an external criterion that could be the result of job crafting (Cronbach & Meehl, 1955). Testing Hypothesis 5 in Study 4, the criterion validity of each of the job crafting scales were tested by examining the relationships between each scale and outcomes measures through (i) correlational analysis and (ii) regression analysis using SPSS 23. We conducted regression analyses on several samples to maximise power.

## Results

### *Study 1: scale validity of the JCRQ in a diary study*

#### *Descriptive statistics*

The means, standard deviations and correlations between the 14 items of the diary data (Sample 1), at the between- and within-person levels of analysis, can be obtained upon request from the first author. Prior to conducting the multilevel CFA (MCFA), we examined the intraclass correlations (ICCs) to determine whether the use of multilevel analysis was justified. The ICC reflects the amount of between-person variability compared to the amount of total variability. ICC values of the items ranged from .49 to .65. The ICC ranges in value from 0 to 1, with higher values indicating greater proportions of between-level variance, which means a higher bias probability if the multilevel nature of the data is not taken into account (Dyer, Hanges, & Hall, 2005). Previous MCFA research has reported lower ICC values than those in the present study (e.g. Bakker et al., 2015; Dyer et al., 2005; Hox, 2002). Within the literature, there are no clear guidelines for appropriate values of ICC. However, a review by James (1982) found values ranging from 0 to 0.50, with 0.12 as the median. We therefore assume that our ICC values indicate sufficient between-person variation in our data to use multilevel analysis.

#### *Multilevel confirmatory factor analyses*

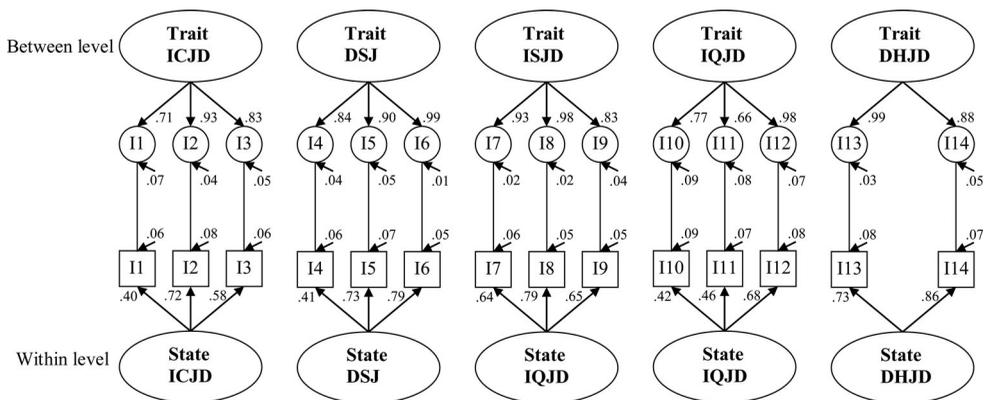
Model 1 was proposed as the null hypothesis, postulating a single factor in which the items of the five dimensions loaded on one overall factor. Model 2, tested a three-factor model, in which the items of decreasing demands dimensions collapsed into one factor, the items of the increasing demands collapsed into a second factor and the items of increasing social

job resources in a third factor. Furthermore, we also tested a four-factor model (Model 3), in which decreasing social and hindrance job demands collapsed into one factor. The remaining dimensions were kept as the original structure. Finally, the fourth model assumed the original five-factor structure.

The results revealed that the five-factor solution fitted the data well ( $\chi^2 = 310.45$ ,  $df = 134$ ,  $CFI = .92$ ,  $TLI = .89$ ,  $RMSEA = .04$ ). The SRMR at the two levels indicated that the fit of the within level of the model was better than the between level (SRMR-within = .05 vs. SRMR-between = .09). All the values of the alternative models indicated a significant lack of fit. The one-factor model fit was  $\chi^2 = 1661.65$ ,  $df = 167$ ,  $CFI = .32$ ,  $TLI = .26$ ,  $RMSEA = .10$ ,  $SRMR$ -within = .12 and  $SRMR$ -between = .21. The fit of the three-factor model was  $\chi^2 = 961.29$ ,  $df = 159$ ,  $CFI = .64$ ,  $TLI = .59$ ,  $RMSEA = .08$ ,  $SRMR$ -within = .09 and  $SRMR$ -between = .14. The four-factor model revealed a fit of  $\chi^2 = 836.45$ ,  $df = 152$ ,  $CFI = .69$ ,  $TLI = .63$ ,  $RMSEA = .07$ ,  $SRMR$ -within = .12 and  $SRMR$ -between = .21. Furthermore, the Satorra–Bentler scaled chi-square difference test shows that the five-factor model provided a much better fit to the data than (a) a one-factor model ( $SBS-\Delta\chi^2 = 855.04$ ,  $\Delta df = 33$ ;  $p < .001$ ); (b) the three-factor model ( $SBS-\Delta\chi^2 = 457.09$ ,  $\Delta df = 25$ ;  $p < .001$ ) and (c) the four-factor model ( $\Delta\chi^2 = 351.24$ ,  $\Delta df = 18$ ;  $p < .001$ ). Thus, the five-factor model explains our data best, and therefore Hypothesis 1 was supported.

According to Hypothesis 2, again using Sample 1, the factor loadings of the five dimensions would be lower on the day level as compared to the general level. As can be seen in Figure 1, all factor loadings were significant ( $ps < .001$ ). Overall, the factor loadings at the between-person level were higher (.71–.99) than at the within-person level (.40–.86). Item 1 showed the lowest factor loading at both levels (“Today, I took on extra tasks even though I do not receive extra salary for them”).

In conclusion, our tests of Hypotheses 1 and 2 confirm that the JCRQ can be used in diary studies. Analyses revealed that the five-factor structure was confirmed in the diary study in both within and between-level analyses.



**Figure 1.** Path diagram of the final five-factor model (standardised solution).

Note: Between level = between-person level. Within level = Within-person level. ICJD = Increasing challenging job demands; DSJD = Decreasing social job demands; ISJD = Increasing social job resources; IQJD = Increasing quantitative job demands; DHJD = Decreasing hindrance job demands. Trait = job crafting behaviours fluctuating from day to day. State = general levels of job crafting.

**Table 2.** Sample score reliabilities (Cronbach's alpha).

	ICJD	DSJD	ISJD	IQJD	DHJD
Spain (diary data; $N = 820$ observations) <sup>a</sup>	.70–.82	.80–.89	.85–.88	.68–.74	.84–.91
China ( $N = 129$ )	.74	.71	.76	.80	.71
Taiwan ( $N = 138$ )	.68	.77	.78	.68	.72
UK ( $N = 96$ )	.77	.78	.73	.71	.67
Spain (survey data; $N = 164$ )	.68	.68	.85	.70	.76
Spain (longitudinal data; $N = 191$ ) <sup>b</sup>	.77–.81	.70–.77	.80–.88	.60–.61	.77–.82

Note: ICJD = Increasing challenging job demands; DSJD = Decreasing social job demands; ISJD = Increasing social job resources; IQJD = Increasing quantitative job demands; DHJD = Decreasing hindrance job demands.

<sup>a</sup>For diary sample we report the range of reliabilities among five days of measurement.

<sup>b</sup>For longitudinal sample we report the range of reliabilities among three different waves.

### Study 2: testing the validity of the JCRQ across cultural contexts

Using Samples 1 and 2, we tested the validity of the JCRQ across different cultural contexts. We explored the reliabilities of the questionnaire across four different cultural contexts: two Western and two Asian cultures. Table 2 displays the reliabilities per sample. As can be seen, most of the overall reliabilities are acceptable and above the commonly accepted threshold of .70 (Nunnally & Berstein, 1994).

To offer evidence for scale validity, testing Hypothesis 3, we assessed the measurement invariance of the JCRQ scale, studying to what extent respondents from different cultures interpret a given measure in a conceptually similar manner (Vandenberg & Lance, 2000). To proceed with this test, we used Sample 2, from the UK ( $N = 96$ ), Taiwan ( $N = 138$ ), China ( $N = 129$ ) and the survey level of job crafting of the first Spanish sample ( $N = 164$ ).

We assessed measurement invariance through several cross sample comparisons (Brown, 2006). Comparing the UK and Spanish sample, we found both *configural* (RMSEA = .090, CFI = .95, TLI = .94) and *metric* invariance (RMSEA = .089, CFI = .95, TLI = .94; model comparison:  $\Delta \chi^2 = 9.372$ ,  $\Delta df = 4$ ,  $p = ns$ ). We further tested the between-group equality of indicator intercepts, but we found that the means of the indicators were different between our samples.

We found the same pattern of results comparing the Chinese and Taiwan samples, finding both *configural* invariance (RMSEA = .109, CFI = .93, TLI = .92) *metric* invariance (RMSEA = .104, CFI = .93, TLI = .92; model comparison:  $\Delta \chi^2 = 7.508$ ,  $\Delta df = 4$ ,  $p = ns$ ).

Nevertheless, comparing the Spanish sample with the Chinese and the Taiwan we found evidence for *configural* invariance, respectively RMSEA = .107, CFI = .94, TLI = .93 and RMSEA = .098, CFI = .94, TLI = .93. A similar pattern was found when comparing the UK sample with the Chinese sample: RMSEA = .101, CFI = .94, TLI = .93. The comparison between the UK and the Taiwan sample allowed us to find both a *configural* RMSEA = .102, CFI = .91, TLI = .90 as well as a *metric* invariance (RMSEA = .098, CFI = .92, TLI = .90; model comparison:  $\Delta \chi^2 = 3.691$ ,  $\Delta df = 4$ ,  $p = ns$ ).

In conclusion, in Study 2 we found the JCRQ to be reliable across four different national contexts and we were able to find *metric* invariance comparing four different cultures and samples, except for the Chinese respondents compared to the UK and Spanish respondents, where we just found support for *configural* invariance.

### **Study 3: test–retest reliability**

Using Sample 3, we explored our fourth Hypothesis on the test–retest reliability of the JCRQ by correlating all the dimensions across three waves using the longitudinal survey sample. Results showed that increasing challenging job demands measured at Time 1 was positively and significantly related to its measurement at Time 2 ( $r = .74, p < .01$ ) and Time 3 ( $r = .70, p < .01$ ), and the relationship between Time 2 and Time 3 was  $r = .76, p < .01$ . Decreasing social job demands measured at Time 1 was positively and significantly related to its measurement at Time 2 ( $r = .50, p < .01$ ) and Time 3 ( $r = .43, p < .01$ ), and the relationship between Time 2 and Time 3 was  $r = .56, p < .01$ . Increasing social job resources measured at Time 1 was positively and significantly related to its measurement at Time 2 ( $r = .60, p < .01$ ) and Time 3 ( $r = .63, p < .01$ ), and the relationship between Time 2 and Time 3 was  $r = .70, p < .01$ . Increasing quantitative job demands measured at Time 1 was positively and significantly related to its measurement at Time 2 ( $r = .62, p < .01$ ) and Time 3 ( $r = .69, p < .01$ ), and the relationship between Time 2 and Time 3 was  $r = .76, p < .01$ . Decreasing hindrance job demands measured at Time 1 was positively and significantly related to its measurement at Time 2 ( $r = .51, p < .01$ ) and Time 3 ( $r = .53, p < .01$ ), and the relationship between Time 2 and Time 3 was  $r = .62, p < .01$ . In summary, all the test–retest correlation values were positive and significant, ranging from .43 to .76. Thus all correlations exceeded the minimum correlation criterion of .40 between data collection points (Robinson, Shaver, & Wrightsman, 1991).

### **Study 4: criterion validity: relationships between the job crafting scales and well-being outcomes**

Our fifth Hypothesis stated that job crafting behaviours would be positively related to job satisfaction in Samples 1 (general survey only) and 2, and positively related to intra-role and extra-role performance in China, the UK and Taiwan (Sample 2). Table 3 shows that 13 out of the 20 correlations between the five job crafting scales and the outcomes were significant at  $p > .05$ . Across China, Taiwan and the UK, increasing challenging demands was found to be strongly correlated with in-role and extra-role performance ( $r = .49, p > .01$  and  $.42, p > .01$ , respectively). Increasing quantitative job demands was strongly correlated with extra-role performance and decreasing social job resources was negatively correlated with job satisfaction ( $r = -.12, p > .05$ ).

Next, we conducted hierarchical regression analyses. As age and country of residence were significantly related to job satisfaction ( $r = .17, p > .01$  and  $.09, p > .05$ , respectively), in-role performance ( $r = .08, p < .05$  and  $.34, p > .01$ , respectively) and extra-role performance ( $r = .15, p > .01$  and  $.30, p > .01$ , respectively), we controlled for these in our analyses. We found that increasing challenging job demands and decreasing hindrance job demands were significantly related to job satisfaction ( $\beta = .26, p < .001$ ;  $\beta = .16, p < .001$ , respectively). Decreasing social job demands was negatively related to job satisfaction ( $\beta = -.19, p < .001$ ). Increasing challenging job demands and decreasing social job demands were positively related to in-role performance ( $\beta = .34, p < .001$ ,  $\beta = .14, p < .05$ , respectively). Extra-role performance were significantly related to increasing challenging job demands ( $\beta = .24, p < .001$ ) and increasing quantitative job demands ( $\beta = .33, p < .001$ ). Table 4 shows the results of the regression analyses.

**Table 3.** Samples 1–4: correlations and reliabilities for overall samples in the diagonal.

Variable	Mean	SD	N	1	2	3	4	5	6	7	8
1. ICJD	3.67	.67	527	.73							
2. DSJD	3.13	.98	527	.23**	.82						
3. ISJD	3.09	.99	527	.32**	.37**	.85					
4. IQJD	3.76	.66	527	.43**	.22**	.41**	.73				
5. DHJD	3.31	.91	527	.08	.18**	.17**	.10*	.61			
6. Job satisfaction	3.72	.80	504	.24**	-.12**	.04	.06	.15**	.58		
7. In-role perf	3.79	.66	350	.49**	.22**	.20**	.29**	.12*	-	.82	
8. Extra-role perf	3.76	.53	350	.40**	-.02	.15**	.44**	.05	-	-	.73

Notes: ICJD = Increasing challenging job demands; DSJD = Decreasing social job demands; ISJD = Increasing social job resources; IQJD = Increasing quantitative job demands; DHJD = Decreasing hindrance job demands; In-role per = In-role performance; Extra-role per = Extra-role performance. For criterion validity the following samples were used: Job satisfaction: Samples Spain (cross-sectional), China, Taiwan and UK (N = 527). In-role and extra-role performance: Samples China, Taiwan and the UK (N = 363). For job satisfaction, we report the inter-item correlation.

### Discussion

In the present study, we tested the validity and reliability of an existing the JCRQ measuring five dimensions of job crafting based of the JD-R model. We used different methods and sampling data from different cultural contexts.

Study 1 confirmed our first Hypothesis: in our diary study (Sample 1), the five-factor structure (increasing challenging job demands, decreasing social job demands, increasing social job resources, increasing quantitative job demands and decreasing hindrance job demands) was confirmed suggesting that the JCRQ can be used in diary studies. In Study 1, we also confirmed our second Hypothesis: in line with previous studies, the factor loadings were lower on the day level compared to the between-individual level (e.g. Bakker et al., 2015; Petrou et al., 2012). The results offer support for the suggestion that job crafting behaviours fluctuate from day to day. In surveys, employees indicate general levels of job crafting, so responses are aggregated and the average experience is reported but in diary studies, researchers can capture the daily experience and thus may explore the dynamics of job crafting and the effects on performance and well-being. Data at the within-person level provided a better fit to the model, possibly

**Table 4.** Summary of hierarchical regression analysis of the relationships between job crafting scales and well-being outcomes.

Independent Variables	Job satisfaction			In-role performance			Extra-role performance		
	B	SE B	β	B	SE B	β	B	SE B	β
<i>Step 1</i>									
Age	.08	.03	.11*	.17	.03	.29***	.14	.03	.29***
China	.01	.10	.01	-.27	.08	-.19**	-.06	.07	-.05
UK	-.08	.11	-.04	-.23	.08	-.16**	.08	.07	.07
Spain	.16	.09	.10	-	-	-	-	-	-
<i>Step 2</i>									
ICJD	.30	.06	.26***	.36	.05	.34***	.20	.04	.24***
DSJD	-.16	.04	-.19**	.11	.04	.14**	-.05	.03	-.08
ISJR	.06	.04	.07	.07	.04	.08	-.01	.04	-.01
IQJD	-.02	.06	-.02	.08	.05	.07	.29	.05	.33***
DHJD	.15	.04	.16***	.08	.04	.10	.01	.03	.02
	$R^2 = .13; N = 503$			$R^2 = .34; N = 349$			$R^2 = .31; N = 349$		

Notes: ICJD = Increasing challenging job demands; DSJD = Decreasing social job demands; ISJD = Increasing social job resources; IQJD = Increasing quantitative job demands; DHJD = Decreasing hindrance job demands. Job satisfaction: Spain (cross-sectional), China, Taiwan and UK. In- and extra-role performance: China, Taiwan and the UK.

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

because the between-level data are dependent on respondents' retrospectively aggregating their average levels of job crafting.

In Study 2, we found support for Hypothesis 3: the five-dimension structure of the JCRQ was replicated across the four countries in Samples 1 and 2. We consider the results of this invariance subsection as preliminary for two reasons. First, statistical power was low due to small sample sizes and this may have influenced the results. Second, our samples were not of equal sample size and this makes the interpretation of the analysis more complex. Some fit indexes used in the CFA are sensitive to the sample size, especially those based on  $\chi^2$ , employed in the model comparison (Brown, 2006). We thus suggest that we present a first step in a cross-cultural comparison of the scale presented here. Future research should address this issue with larger and balanced samples.

Our results suggest that job crafting should be measured using five scales. Increasing job demands may be measured using two measures that distinguish between crafting a qualitatively different job and doing more of the same. Our results also confirm that employees' job craft both to minimise unwanted social relations and to strengthen desired social relations.

Our fourth Hypothesis was confirmed using data from Sample 3 in Study 3. In a Spanish longitudinal sample, we found support for the five job crafting scales being reliable over three time points with two months in between them. We thus replicate the test-retest reliability conducted by Nielsen and Abildgaard (2012) who also found the measure to be stable over two measurement points with 12 months in between them.

We found partial support for Hypothesis 5 in Study 4: job crafting behaviours were related to job satisfaction (in Samples 1 and 2), and in-role and extra-role performance (using Sample 2). In line with Tims et al. (2012) we found that increasing challenging demands was positively related to performance. In the present paper, we found significant relationships with both in-role and extra-role performance. Job crafting to reduce hindrance job demands was unrelated to any of these outcomes, but positively related to job satisfaction. We also found that increasing challenging job demands was positively related to job satisfaction. We also confirmed the relationship between job crafting and extra-role performance (Slemp & Vella-Brodrick, 2013). It is to be expected that taking on extra work or seeking out new opportunities may be related to better performance, but the finding that decreasing social job demands is positively related to in-role performance offers important insight into how organisations may improve performance, that is, allowing employees some freedom over whom they interact with at work. Decreasing social job demands was negatively related to job satisfaction suggesting that such freedom may enhance in-role performance but at the detriment of how satisfied employees are with their jobs, suggesting that there is a fine balance to be struck in how much of such freedom employees should be allowed.

### *Strengths and limitations*

The main strengths of the present validation of the JCRQ are the use of different methods and different samples from four diverse cultural contexts. Our research, however, is not without its limitations and these should be considered when interpreting the results of

the present validation. First, as mentioned in the discussion the sample sizes of the Chinese, Taiwanese and UK samples were small and this may have influenced our results. We still argue it is worthwhile considering this preliminary test as it gives some indication that the JCRQ can be applied across a range of cultural settings.

Second, we only tested criterion validity in cross-sectional samples. Reversed causality or even reciprocal relationships may be possible; however, existing studies supports the direction tested in the present paper (e.g. Nielsen & Abildgaard, 2012). Moreover, the aim of Study 4 was not to establish the causal relationships between job crafting and other constructs but to confirm that the JCRQ is a psychometrically sound questionnaire to measure job crafting. Also, it is worth mentioning that we did not include all outcome measures in all samples. Except job satisfaction, which was included in all the cross-sectional samples, the rest of the outcomes were included only in the Chinese, Taiwanese and UK respondents. For practical reasons it was not possible to include all outcomes across all samples. Future studies should explore the criterion validity in longitudinal samples.

A third limitation of the studies is that test-retest was conducted in one sample of employees with little formal education (Sample 3); however, we argue this test still adds value as we were able to extend previous research including three time points and testing it in another country.

A fourth limitation is that we deleted one item from the job crafting challenging demands scale in the diary study as the item was not directly translatable into a daily context, and thus the scale structure is not exactly the same in the survey and the diary studies. We chose to delete one item rather than inventing a new one to keep the content of the scales across designs as similar as possible and to keep the diary study as short as possible.

A fifth limitation is that we cannot make comparisons of the JCRQ with the Tims et al. (2012) measure or other measures of proactive behaviours in the workplace. To keep the survey short we focused on validating the JCRQ only. Future studies should compare this questionnaire to other measures of proactive behaviour.

Finally, a few dimensions in the cross-cultural study had Cronbach's alpha values slightly below .70. A possible explanation may be the low number of items included in each dimension. The reliabilities in Nielsen and Abildgaard (2012) were higher, possibly due to a larger sample size. It has been suggested that average inter-item correlation is a good measure of a scale internal consistency, even better than coefficient alpha, and recommended values are within the range .15–.50 (Clark & Watson, 1995, p. 316). Mean inter-item correlations observed in the present study for increasing challenging job demands were .36 for respondents in Taiwan and Spain. For decreasing social job demands of the Spanish sample with survey data we obtained a value of mean inter-item correlations of .42. For increasing quantitative job demands the value for Taiwan was .43, whereas the value of mean inter-item correlations for decreasing hindrance job demands in UK was .46. Therefore, all values were within the range recommended by Clark and Watson (1995).

## Conclusion

The main contribution of this paper is that we confirm and extend the existing validation of the job crafting questionnaire (the JCRQ) developed by Nielsen and Abildgaard (2012).

We confirm the five-factor structure in a diary study and in different cultural contexts and occupational samples. In doing so, we provide valuable information on a comprehensive questionnaire that measures several dimensions of job crafting that can be used in both diary studies and in different occupational settings and cultural contexts. We hope this will inspire researchers to use the questionnaire.

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No potential conflict of interest was reported by the authors.

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