

Original

Validation of the Japanese version of the job crafting scale

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Abstract: Objectives: The aim of this study was to validate the Japanese version of the job crafting scale (JCS-J). JCS measures four independent job crafting dimensions, namely increasing structural job resources, decreasing hindering job demands, increasing social job resources, and increasing challenging job demands. **Methods:** The translated and back-translated JCS-J questionnaires were administered online to 972 employees of a Japanese manufacturing company. The data were then divided into independent explorative and confirmative samples. Exploratory and confirmatory factor analyses were performed to evaluate the factorial validity of JCS-J. The relationship with potential consequences of job crafting (e.g., job demands, job resources, and psychological well-being) was investigated to evaluate construct validity. Internal consistency was examined to evaluate the reliability of the four JCSs. **Results:** An exploratory factor analysis extracted a five-factor solution. Decreasing hindering job demands was further split into two separate dimensions supporting a five- rather than four-factor structure. A series of confirmatory factor analyses revealed that the modified five-factor model that allows covariance between items fits the data best. Construct validity was generally supported by the expected correlations of each job crafting dimension with each corresponding job resource (+), job demand (+), and psychological well-being (+). Cronbach's α coefficient was sufficient for each of the four dimensions of job crafting

(α ranged between 0.76 and 0.90). **Conclusions:** This study confirmed that JCS-J is an adequate measure of job crafting that can be used in the Japanese context.

(J Occup Health 2016; 58: 231-240)

doi: 10.1539/joh.15-0173-OA

Key words: Job crafting, Job demands-resources theory, Scale development, Well-being

Introduction

In the past decades, research on work-related well-being has shifted its focus from negative aspects, such as burnout or psychological distress, to positive aspects, such as work engagement¹). Although the job demand-control model²) and effort-reward imbalance model³) are exclusively focused not only on negative outcomes (e.g., psychological distress) but also on positive ones (e.g., job satisfaction), empirical studies have mainly focused on negative outcomes^{4,5}). In contrast, the job demand-resource (JD-R) model consistently focuses on both negative and positive outcomes of employee well-being^{6,7}). The JD-R model also acknowledges the proactive role employees can play in optimizing their own work environment. This proactive behavior is called job crafting⁸). Through job crafting, individuals actively strive to mobilize job demands and job resources to fulfill their needs and thrive at work⁹).

Presently, the job crafting scale (JCS) is mostly used in Western countries. Versions are available in languages such as English and Dutch¹⁰). Through job crafting behaviors, employees can change how work is conceptualized and performed and how often and with whom they interact⁹). Job crafting behaviors may lead to many positive

Received June 30, 2015; Accepted December 6, 2015

Published online in J-STAGE April 22, 2016

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outcomes⁸⁾. To investigate and apply the concept of job crafting in Japan, the validation of a Japanese version of JCS is a necessary first step. In 2012 in Japan, more than half of all workers reported job-related distress caused by workplace human relations, qualitative workload, and quantitative workload¹¹⁾. As in other countries, the concept of job crafting is potentially beneficial for the well-being of Japanese workers.

The aim of the current article is to validate the Japanese version of the JCS (JCS-J), a self-report questionnaire to measure employee job crafting, and to examine its psychometric properties.

Job crafting

Job crafting has been defined as “self-initiated change behaviors that employees engage in with the aim to align their jobs with their own preferences, motives, and passions”¹²⁾. Tims et al.¹³⁾ argued that by framing job crafting in terms of job demands and resources, it is possible to capture many aspects that employees may alter. They distinguished four independent job crafting dimensions: increasing structural job resources, decreasing hindering job demands, increasing social job resources, and increasing challenging job demands. To measure these four dimensions, Tims et al. developed JCS. Two of the four job crafting dimensions refer to the type of job resources that are crafted: structural (e.g., autonomy and variety) and social job resources (e.g., social support and feedback)¹⁴⁾. The other two dimensions refer to job demands: challenging (e.g., workload and time pressure) and hindering job demands (e.g., role ambiguity and role conflict)¹⁴⁾.

Job crafting may lead to many positive outcomes for the employee as well as for the organization⁹⁾. Employees may minimize the presence of hindering job demands and maximize the availability of job resources and challenging job demands, resulting in improved well-being^{9,15)}. Indeed, research has shown that job crafting positively impacts well-being via changes in job demands and increases in job resources, which is consistent with the JD-R theory¹⁴⁾.

Association of job crafting with potential outcomes

Job demands and job resources

Two previous meta-analytic studies^{16,17)} examined the effect of two groups of job demands on work-related outcomes. The first group was called “challenging job demands” (e.g., workload and time pressure), and the second group was called “hindering job demands” (e.g., role ambiguity and role conflict). A job demand is seen as challenging when work-related demands, although potentially stressful, have potential gains for individuals (e.g., increased knowledge and skills)¹⁸⁾. However, a job demand is seen as a hindrance when the work-related demands tend to interfere with an individual’s achievement¹⁸⁾. Therefore, we hypothesize that increasing challenging job

demands has a positive association with challenging job demands (hypothesis 1a) and decreasing hindering job demands has a negative association with hindering job demands (hypothesis 1b).

In addition to job demands, the JD-R theory⁷⁾ distinguishes job resources as aspects of the work environment that buffer the impact of job demands and facilitate goal achievement. Job resources are the most important predictors of work engagement¹⁹⁾ and are composed of structural and social resources¹³⁾. Structural job resources are the job design, such as the variety of resources and opportunities for development. Social job resources are the social aspects of the job, such as social support and supervisory feedback. Employees may proactively change their work environment by modifying their job resources. For example, employees who engaged in job crafting by asking for feedback reported higher levels of actual feedback over time¹⁴⁾. Through job crafting, employees may align their job with their individual preferences, skills, and abilities¹³⁾. Therefore, we hypothesize that increasing structural job resources has a positive association with structural job resources (hypothesis 2a), and increasing social job resources has a positive association with social job resources (hypothesis 2b).

Psychological well-being

Theoretically, the association between job crafting and psychological well-being can be explained using the conservation of resources (COR) theory²⁰⁾. The COR theory asserts that an individual aspires to preserve, protect, and build resources. Accordingly, resource loss is the primary operating mechanism driving stress reactions. As long as an individual can limit resource loss, he/she will manifest fewer negative outcomes because resources are integral to the individual’s ability to offset stress, improve her/his conditions, and deter future stressful experiences. In contrast, COR theory suggests that resource gains build on themselves, and as people gain resources, they experience more positive health and well-being. Therefore, increasing structural and social resources may lead to maintenance and restoration of job resources. Moreover, increasing challenging job demands and decreasing hindering job demands may lead to maintaining and restoring existing resources. Resource gain may increase positive emotions as well.

Previous research has indicated that job crafting is positively associated with work engagement and job satisfaction^{8,21)}. A recent meta-analysis¹⁷⁾ found that challenging job demands were positively related to work engagement. Challenging job demands offer mastery experiences that in turn may lead to job satisfaction^{22,23)}. Previous meta-analyses demonstrated the negative effect of hindering job demands on work engagement and job satisfaction^{16,22)}. Prolonged exposure to hindering job demands may instigate a health impairment process²⁴⁾. Job re-

sources are the most important predictors of positive emotions^{25,26}. Employees with more job resources experience less stress than those with fewer job resources²⁷. Through job crafting, employees can optimize their environment by looking for the right job resources and sufficiently challenging job demands. They can also reduce their hindering job demands. Thus, job crafters may have all the means to perform well, avoid stress, and sustain work engagement. Therefore, we expect that the four job crafting dimensions have a positive association with work engagement and job satisfaction (hypothesis 3a) and a negative association with physical complaints and psychological distress (hypothesis 3b).

The current study

This study aims to validate JCS-J in a sample of Japanese employees. More specifically, we examined its factorial and construct validity as well as its reliability (internal consistency).

Method

Participants and procedure

This study was based on cross-sectional data obtained from employees of a manufacturing company in Japan in October 2013. All employees (n=973) were invited to participate in an online survey; thus, participants supplied data via the Internet. In total, 972 employees completed the questionnaire (response rate of 99.9%) of which 796 were male (81.9%). Of these participants, the age distribution was 12.8% (n=125) in their 20s, 19.2% (n=185) in their 30s, 34.5% (n=334) in their 40s, and 33.5% (n=328) in age 50 or older.

Ethics

The study aims and protocol were approved by the ethics review board of the University of Tokyo in 2013 before starting the study. Participants had the option of not responding to any part of the questionnaire at any time and also the option to discontinue the survey at any point. Consent was implied on the basis of voluntary participation according to the ethics code for public health research in Japan²⁸.

Translation of the JCS

First, the English version of the JCS was translated into Japanese by the authors of the current study. Then, back-translation into English was performed by an English and Japanese bilingual specialist who had not read the original items and who held a degree in occupational health psychology. We compared the English and back-translated versions of the JCS and created a preliminary Japanese version after some corrections for terms, meanings, and content of each item. The Japanese version of the JCS is

provided in Appendix 1.

Measures

Job crafting. Job crafting was assessed with the translated version of the scale by Tims et al.¹³. The items on the JCS are grouped into four subscales that reflect the underlying dimensions of job crafting: increasing structural job resources (five items), decreasing hindering job demands (six items), increasing social job resources (five items), and increasing challenging job demands (five items). All items were scored on a five-point frequency scale ranging from 1 (never) to 5 (often).

Job demands. In accordance with previous studies in Europe and Japan^{16-18,22,29}, we used workload and time pressure as challenging job demands and role ambiguity as a hindering job demand. Workload and time pressure as challenging job demands were assessed using the corresponding subscale of the new version of the Brief Job Stress Questionnaire (New BJSQ) consisting of three items (e.g., "I have plenty of work to do") on the basis of a previous study³⁰. The New BJSQ has an acceptable internal consistency reliability and construct validity among Japanese workers³⁰. Role ambiguity as a hindering job demand was also assessed using five items from the New BJSQ (e.g., "I know what my job responsibilities are." This item is reverse scored.) Items were scored on a four-point Likert scale, ranging from 1 (disagree) to 4 (agree).

Job resources. In accordance with Tims et al., job resources were measured on two factors, structural and social job resources¹³. The structural job resources contain job control (three items), suitable jobs (one item), skill utilization (one item), meaningfulness of work (one item), role clarity (one item), and career opportunity (one item). Social job resources refer to supervisor support (three items), coworker support (three items), momentary/status reward (one item), esteem reward (one item), job security (one item), leadership (one item), interactional justice (one item), workplace where people complement each other (one item), and workplace where mistakes are acceptable (one item). Each job resource was assessed using the corresponding subscale of the New BJSQ³⁰. Items were scored on a four-point Likert scale, ranging from 1 (disagree) to 4 (agree).

Well-being. Work engagement was assessed with the short form of the Utrecht Work Engagement Scale (UWES)^{31,32}. The UWES includes three subscales that reflect the underlying dimensions of engagement: vigor, dedication, and absorption (three items for each). All items were scored on a seven-point Likert scale ranging from 0 (never) to 6 (always). The validation study of the Japanese version of the UWES³² recommends that work engagement should be treated as a unitary construct owing to high correlations among the three components.

Job satisfaction was assessed using one item from the New BJSQ³⁰. The item "I am satisfied with my work" was

scored on a four-point Likert scale ranging from 1 (disagree) to 4 (agree).

Physical complaints and psychological distress were assessed using the corresponding subscales of the New BJSQ³⁰. Physical complaints were measured by means of 11 items. Psychological distress was measured by means of 15 items, mainly reflecting fatigue, anxiety, and depression. All items were scored on a four-point Likert scale ranging from 1 (very rarely) to 4 (almost all the time).

High scores indicate a high level for each dimension of job crafting, job demands, job resources, work engagement, job satisfaction, physical complaints, and psychological distress.

Analyses

We split the data into two random groups for exploratory and confirmatory factor analyses. In evaluating the factorial validity of the JCS-J, we first conducted exploratory factor analysis, whereby all 21 items were entered using the unweighted least squares method. We extracted factors with eigenvalues greater than one and then obtained factor structures with promax rotation. Next, we conducted confirmatory factor analysis. We compared the hypothesized four-factor model with a one-factor model, whereby all items loaded on one general job crafting factor. Model fit was assessed using a combination of fit indices including the goodness of fit index (GFI), parsimony goodness of fit index (PGFI), non-normed fit index (NNFI), the comparative fit index (CFI), parsimony normed fit index (PNFI), and the root mean square error of approximation (RMSEA). The acceptability of model fit was judged by the following criteria: GFI, PGFI, NNFI, CFI, and PNFI of >0.90 and RMSEA of <0.08³³.

In evaluating construct validity, we calculated the Pearson's correlation coefficients of job crafting with job demands, job resources, and well-being. In evaluating internal consistency, Cronbach's α values were calculated. The level of significance used was 0.05 (two tailed). IBM SPSS statistics for Windows, Version 22 and Amos 18 software (IBM Corp., Armonk, NY, USA) were used for the statistical analyses.

Results

Factorial validity

Table 1 shows the results of exploratory factor analysis of JCS-J. Contrary to our expectations, five factors with eigenvalue of >1 were extracted. All items for increasing structural job resources, challenging job demands, and social job resources showed the greatest factor loadings on factors 1, 2, and 3; three of the six items for decreasing hindering job demands showed the greatest factor loadings on factor 4; and the remaining three items loaded on factor 5. Interfactor correlations between the factors

ranged from 0.02 (between factors 1 and 4) to 0.64 (between factors 1 and 2).

In the next step, we conducted confirmatory factor analysis for the other sample with exploratory factor analysis. As shown in Table 2, the hypothesized four-factor model (Model 2) showed a significantly better fit to the data than the one-factor model (Model 1) [$\Delta\chi^2(6)=3922.20, p<0.001$]. The fit indices of the four-factor model (Model 2) were GFI=0.85, PGFI=0.68, NNFI=0.85, CFI=0.88, PNFI=0.74, and RMSEA=0.08. Examination of the modification indices (MIs) suggested that the fit would improve if the error terms of items 6 and 7 (MI=104.76) were allowed to correlate³⁴. This suggests that these two items (i.e., mental and emotional demands) are rather similar in terms of psychological content. Please note that each pair of error terms belonged to the same dimension; therefore, we reasoned that these correlations were warranted³⁴. Respondents reacted similarly to the items with highly similar content, presumably producing similar errors in the measurement. The modified four-factor model (Model 3) significantly improved the fit in comparison with Model 2 [$\Delta\chi^2(1)=107.04, p<0.001$], with an additional increase in all fit indices. In Model 3, all items were significantly loaded on their respective latent factors. Interfactor correlations between the latent factors were 0.13 (between decreasing hindering job demands and increasing structural job resources and between decreasing hindering job demands and increasing social job resources), 0.21 (between decreasing hindering job demands and increasing challenging job demands), 0.42 (between increasing structural job resources and increasing social job resources), 0.52 (between increasing social job resources and increasing challenging job demands), and 0.66 (between increasing structural job resources and increasing challenging job demands). These interfactor correlations were all statistically significant ($p<0.01$). Examination of MIs of Model 4 suggested that the fit of the model to the data would improve if the error terms of items 10 and 11 (MI=45.04) and items 20 and 21 (MI=44.36) were allowed to correlate. However, because items 10 and 11 did not belong to the same dimension, we reasoned that only items 20 and 21 should be allowed to correlate. The modified five-factor model (Model 5) significantly improved the fit in comparison with Model 4 [$\Delta\chi^2(1)=50.1, p<0.001$], with an additional increase in all fit indices. Comparison of model fit indices also indicated that Model 5 had a slightly better fit than Model 3.

Reliability

Table 3 shows that the internal consistencies of the original four subscales are all sufficiently high to conclude that each factor is reliable. Cronbach's $\alpha=0.90$ for increasing structural job resources, $\alpha=0.80$ for decreasing hindering job demands, $\alpha=0.76$ for increasing social job resources, and $\alpha=0.84$ for increasing challenging job de-

Table 1. items, means, standard deviations, and exploratory factor analysis with unweighted least squares method and pro-max rotation (N=486)

No.	Items	Mean	SD	Factor					Communality
				1	2	3	4	5	
Increasing structural job resources									
1	I try to develop my capabilities	2.78	1.04	0.93	-0.01	0.00	0.06	-0.06	0.82
2	I try to develop my self professionally	2.72	1.03	0.92	0.01	0.01	0.03	-0.06	0.83
3	I try to learn new things at work	2.84	1.04	0.82	0.03	0.03	-0.05	0.04	0.75
4	I make sure that I use my capacities to the fullest	2.81	0.97	0.82	0.01	0.03	-0.05	0.02	0.72
5	I decide on my own how I do things	3.06	0.98	0.31	0.26	-0.06	-0.05	0.15	0.31
Decreasing hindering job demands									
6	I make sure that my work is mentally less intense	2.07	0.97	-0.02	0.01	-0.03	0.03	0.80	0.63
7	I try to ensure that my work is emotionally less intense	2.44	1.04	0.03	0.12	0.00	0.09	0.58	0.47
8	I manage my work so that I try to minimize contact with people whose problems affect me emotionally	2.16	1.03	-0.02	0.00	-0.02	0.80	0.06	0.69
9	I organize my work so as to minimize contact with people whose expectations are unrealistic	2.00	1.01	0.03	0.07	-0.05	0.99	-0.10	0.89
10	I try to ensure that I do not have to make many difficult decisions at work	1.82	0.87	-0.04	-0.09	0.12	0.52	0.26	0.51
11	I organize my work in such a way to make sure that I do not have to concentrate for too long a period at once	1.86	0.83	0.03	-0.09	0.27	0.14	0.27	0.25
Increasing social job resources									
12	I ask my supervisor to coach me	1.87	0.85	0.11	-0.15	0.71	0.04	0.02	0.50
13	I ask whether my supervisor is satisfied with my work	1.42	0.68	-0.03	-0.07	0.76	-0.08	0.09	0.54
14	I look to my supervisor for inspiration	1.63	0.78	0.02	0.18	0.67	0.05	-0.12	0.57
15	I ask others for feedback on my job performance	1.65	0.78	-0.07	0.07	0.63	-0.02	0.02	0.41
16	I ask colleagues for advice	2.40	1.02	0.03	0.13	0.30	0.03	-0.06	0.14
Increasing challenging job demands									
17	I try to ensure that my work is emotionally less intense	1.60	0.81	-0.10	0.70	0.23	-0.01	-0.11	0.55
18	If there are new developments, I am one of the first to learn about them and try them out	2.18	1.01	0.11	0.74	-0.02	-0.01	-0.03	0.64
19	I organize my work so as to minimize contact with people whose expectations are unrealistic	1.92	1.03	-0.01	0.74	0.01	0.09	-0.04	0.55
20	I regularly take on extra tasks even though I do not receive extra salary for them	2.57	1.17	0.08	0.60	-0.17	0.05	0.10	0.41
21	I try to make my work more challenging by examining the underlying relationships between aspects of my job	2.30	0.98	0.07	0.66	0.04	-0.12	0.17	0.62
Factor contribution				6.30	2.64	1.37	0.91	0.57	
Variance explained (%)				29.99	12.57	6.54	4.31	2.69	
Inter-facotr correlations			2	0.64					
			3	0.36	0.43				
			4	0.02	0.11	0.26			
			5	0.33	0.33	0.36	0.51		
Eigen values				6.69	2.99	1.83	1.29	1.00	

mands.

Association of job crafting with job demands, job resources, and well-being

For hypotheses 1a and 1b, we found that increasing challenging job demands was indeed positively related to

challenging job demands (work load and time pressure; $r=0.11, p<0.01$); however, contrary to our hypothesis 1b, we found a positive association between decreasing hindering job demands and hindering job demands (role ambiguity; $r=0.21, p<0.01$). Therefore, hypothesis 1a was supported but Hypothesis 1b was not.

Table 2. Results of confirmatory factor analyses: Comparison of goodness-of-fit indices among one-factor, four-factor, modified four-factor models, five-factor models, and modified five-factor models (N=486)

Model	GFI	PGFI	NNFI	CFI	PNFI	RMSEA	χ^2	df	p
Model 1 ^{a)} (One-factor model)	0.60	0.49	0.54	0.55	0.49	0.16	4700.98	189	<.001
Model 2 ^{b)} (Four-factor model)	0.85	0.68	0.85	0.88	0.74	0.08	778.78	183	<.001
Model 3 (Modified four-factor model: covariates allowed)	0.88	0.69	0.87	0.90	0.76	0.07	671.74	182	<.001
Model 4 (Five-factor model)	0.90	0.70	0.90	0.93	0.76	0.07	555.71	179	<.001
Model 5 (Modified five-factor model: covariates allowed)	0.91	0.70	0.90	0.94	0.77	0.06	505.62	178	<.001

GFI=Goodness of Fit Index, AGFI=Adjusted Goodness of Fit Index, NNFI=Non-normed Fit Index, CFI=Comparative Fit Index, PNFI=Parsimony Normed Fit Index, RMSEA=Root Mean Square Error of Approximation.

^{a)} All items measuring the four constructs load on one general job crafting factor

^{b)} Each item loads on a hypothesized factors

For hypotheses 2a and 2b, we found that increasing structural job resources was indeed significantly positively correlated with structural job resources ($r=0.46$; $p<0.01$), and increasing social job resources was significantly positively correlated with social job resources ($r=0.24$; $p<0.01$). Therefore, hypotheses 2a and 2b were supported.

For hypotheses 3a and 3b, we indeed found significant correlations for three of the four job crafting dimensions (decreasing hindering job demands was the exception) with work engagement and job satisfaction. Decreasing hindering job demands was not related to work engagement ($r=0.00$, $p>0.05$) and was negatively related to job satisfaction ($r=-0.09$, $p<0.01$). Increasing structural job resources was negatively correlated with physical complaints ($r=-0.11$, $p<0.01$) and psychological distress ($r=-0.12$, $p<0.01$), whereas decreasing hindering job demands was positively correlated with physical complaints ($r=0.18$, $p<0.01$) and psychological distress ($r=0.20$, $p<0.01$). Therefore, hypothesis 3a was partially supported, and hypothesis 3b was not supported.

Discussion

In this study, the English version of JCS was translated into Japanese language (JCS-J), and the reliability and validity of the JCS-J were investigated using a sample of Japanese employees. In doing so, we conducted exploratory and confirmatory factor analyses to evaluate factorial validity and investigated the associations of job crafting with job demands, job resources, and well-being to evaluate construct validity. In addition, we examined the internal consistency to evaluate the reliability of the job crafting instrument.

Factorial validity

Contrary to our expectations, exploratory factor analy-

sis of the JCS-J items extracted five factors, with items of the decreasing hindering job demands scale being loaded on two factors (factors 4 and 5) rather than on a single factor. Items loaded on factor 4 refer to emotional demands, i.e., the degree to which workers avoid communication with those they do not get along with. Items loaded on factor 5 are related to cognitive demands, i.e., the degree to which workers craft their job by themselves.

Although a series of confirmatory factor analyses revealed that the modified five-factor model (Model 5) fits the data better than the modified four-factor model (Model 3), we decided to treat job crafting as a four-factor model in line with the original study¹³⁾. We believe that this will facilitate comparability of the research findings. Please note that although the modified five-factor model (Model 5) fits the data better than the modified four-factor model (Model 3), the fit indices of the modified four-factor model (Model 3) showed a reasonable and acceptable fit³⁵⁾.

Reliability

The internal consistency of each of the four dimensions was sufficient ($0.76<\alpha<0.90$). These coefficients are comparable with or higher than those reported in the original study of the JCS Dutch version ($0.75<\alpha<0.82$)¹³⁾. Thus, the Japanese version of JCS seems to have a level of reliability that is comparable with the Dutch version.

Construct validity (association with job demands, job resources, and well-being)

The present study revealed that increasing challenging job demands is positively related to challenging job demands. This result suggests that those participants who indicated that they craft their work environment by looking for challenges indeed reported higher levels of workload and time pressure. However, decreasing hindering job demands was positively (instead of negatively) corre-

Table 3. Means, standard deviations, internal consistencies (Cronbach’s α) and correlations of variables used in the study (n=972)

	Mean	SD	1	2	3	4	5	6	7
Demographics									
1 Sex	1.18	0.39							
2 Age	2.89	1.02	-0.10**						
Job crafting									
3 Increasing structural job resources	2.83	0.84	-0.12**	-0.07*	(0.90)				
4 Decreasing hindering job demands	2.06	0.68	-0.07*	-0.11**	0.22**	(0.80)			
5 Increasing social job resources	1.80	0.59	-0.04	-0.25**	0.35**	0.33**	(0.76)		
6 Increasing challenging job demands	2.11	0.78	-0.15**	0.07*	0.61**	0.27**	0.41**	(0.84)	
Job demands									
7 Challenges	3.06	0.68	-0.15**	0.03	0.07*	0.04	0.07*	0.11**	(0.82)
8 Hindrances	2.47	0.43	-0.05	0.06	-0.12**	0.21**	-0.02	0.01	0.31
Job resources									
9 Structural job resources	2.74	0.48	-0.05	0.02	0.46**	-0.05	0.16**	0.34**	-0.05
10 Social job resources	2.57	0.50	-0.04	-0.14**	0.33**	-0.14**	0.24**	0.24**	-0.09
Well-being									
11 Work engagement	2.63	1.03	0.03	0.15**	0.50**	0.00	0.28**	0.53**	0.03
12 Job satisfaction	2.45	0.81	0.02	0.05	0.29**	-0.09**	0.15**	0.21**	-0.13
13 Physical complaints	1.78	0.53	0.08*	0.03	-0.11**	0.18**	0.00	-0.04	0.18
14 Psychological distress	1.98	0.58	0.01	-0.06*	-0.12**	0.20**	0.03	-0.05	0.33

	8	9	10	11	12	13	14
Demographics							
1 Sex							
2 Age							
Job crafting							
3 Increasing structural job resources							
4 Decreasing hindering job demands							
5 Increasing social job resources							
6 Increasing challenging job demands							
Job demands							
7 Challenges							
8 Hindrances	(0.66)						
Job resources							
9 Structural job resources	-0.35**	(0.80)					
10 Social job resources	-0.47**	0.56**	(0.81)				
Well-being							
11 Work engagement	-0.25**	0.53**	0.43**	(0.92)			
12 Job satisfaction	-0.40**	0.64**	0.57**	0.53**			
13 Physical complaints	0.35**	-0.31**	-0.40**	-0.23**	-0.36**	(0.86)	
14 Psychological distress	0.49**	-0.44**	-0.46**	-0.33**	-0.50**	0.68**	(0.93)**

** $p < 0.01$, * $p < 0.05$. Cronbach’s α coefficients are displayed in parentheses.

lated with hindering job demands. A possible reason is that employees who suffered from high levels of hindering job demands may have used decreasing hindering job demands as a coping strategy. Future longitudinal studies are required to examine the possibility of this reversed

causation from job demands to job crafting.

In addition, we found significant positive correlations between increasing structural job resources and the availability of structural job resources and between increasing social job resources and the availability of social job re-

sources. Increasing structural job resources may have more impact on job design by allowing workers to acquire more responsibility and knowledge about the job¹³. Increasing social job resources may have more impact on the social aspects of the job and attaining satisfactory levels of interaction¹³. The results suggest that the participants who indicated that they craft their work environment by increasing structural and social job resources were more likely to also report a higher level of these job resources.

We found significant correlations for three of the four job crafting dimensions (decreasing hindering job demands was the exception) with work engagement and job satisfaction. Decreasing hindering job demands was not related to work engagement and was negatively related to job satisfaction. Increasing structural job resources was negatively correlated with physical complaints and psychological distress, whereas decreasing hindering job demands was positively correlated with physical complaints and psychological distress. Well-being variables contained both attitude-related (work engagement and job satisfaction) and health-related aspects (physical complaints and psychological distress). In line with earlier studies, three job crafting dimensions (increasing structural job resources, increasing social job resources, and increasing challenging job demands) were positively correlated with work engagement and job satisfaction^{13,15}. However, decreasing hindering job demands had no association with work engagement and a weak significant negative association with job satisfaction. Therefore, hypothesis 3a is partially supported. Although job crafting behaviors themselves already go beyond what is required for particular work tasks, decreasing hindering job demands may focus on arranging the work environment so that employees can perform their jobs properly within their basic job requirements. Another possible explanation for these unexpected findings is that job crafting itself requires effort and energy. It is conceivable that reducing hindering job demands consumes so many psychological resources that it undermines the possible positive effects²². Moreover, because each job crafting dimension is correlated with the others, decreasing hindering job demands leads to less use of the other three job crafting dimensions. Therefore, restricting the negative aspects of a job does not seem to lead to positive attitudinal outcomes like work engagement and job satisfaction. As mentioned by Tims et al., decreasing hindering job demands showed a different pattern of correlation with peer-rated work engagement compared with the other three job crafting behaviors¹³; the mechanisms between each job crafting dimension and positive attitudinal outcomes may be different. Further studies are needed to determine the impact of reducing hindering job demands and under which conditions it can help to reduce strain and increase work engagement. Regarding hypothesis 3b, contrary to

our expectations, only one dimension, i.e., increasing structural job resources, was observed as predicted, whereas decreasing hindering job demands showed opposite (i.e., positive) associations with health outcomes (i.e., physical complaints and psychological distress). The other dimensions had no systematic relationships with health outcomes. These results generally suggested that job crafting behaviors are not effective in managing physical and psychological health. The exception applies when such behavior is involved with maximizing opportunities for learning, growth, and autonomy (i.e., increasing structural job resources). The unexpected finding for decreasing hindering job demands indicates that those who frequently engage in such crafting behavior are already experiencing high hindering demands (evidenced by the positive correlation in the present study), which eventually lead to lower levels of well-being. Further longitudinal analyses are required to explore the sequential processes among these variables.

Limitations and future directions

The present study has several limitations. First, it is based on survey data that used self-reported measures. In addition to self-report bias owing to, for example, negative effect, common method variance may have affected the results, suggesting that the true associations between variables may be weaker than those observed in this study. Our findings should be replicated with objective measures (e.g., peer ratings of work engagement and job performance) in the future. A second possible limitation is that we used a cross-sectional design, which precludes causal inferences. Longitudinal research that uncovers the causal order of the associations between job crafting and job demands, job resources, and psychological well-being is required. Finally, the reliability and validity of the questionnaire scale often depends on the characteristics of the sample. Generalization of the findings should be made with caution.

Conclusion

This study confirms that JCS-J can adequately measure job crafting and can be used in the Japanese context.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Appendix. 日本語版ジョブクラフティング尺度

以下の項目は、あなたの職場での行動を尋ねるものです。それぞれの質問文をよく読み、最もよく当てはまる選択肢を○で囲んでください。

	まったく ない	時々 ある	しばしば ある	よく ある	とても よくある
1 私は、自分の能力を伸ばすようにしている	1	2	3	4	5
2 私は、自分自身の専門性を高めようとしている	1	2	3	4	5
3 私は、仕事で新しいことを学ぶようにしている。	1	2	3	4	5
4 私は、自分の能力を最大限に生かせるように心がけている。	1	2	3	4	5
5 私は、自分の仕事のやり方を自分自身で決めている。	1	2	3	4	5
6 私は、仕事で思考力が消耗しすぎないようにしている。	1	2	3	4	5
7 私は、自分の仕事で感情的に張りつめないように心がけている。	1	2	3	4	5
8 私は、自分の感情を乱すような問題を抱えている人との関わりを、できるだけ減らすように自分の仕事に取り組んでいる。	1	2	3	4	5
9 私は、非現実的な要求をしてくる人とのかかわりをできるだけ減らすように、自分の仕事を調整している。	1	2	3	4	5
10 私は、困難な決断をたくさんしなくてもいいように、自分の仕事を調整している。	1	2	3	4	5
11 私は、一度に長時間にわたって集中しなくてもいいように、自分の仕事を調整している。	1	2	3	4	5
12 私は、上司に自分を指導してくれるように求める。	1	2	3	4	5
13 私は、上司が私の仕事に満足しているかどうか尋ねる。	1	2	3	4	5
14 私は、上司に仕事で触発される機会を求める。	1	2	3	4	5
15 私は、仕事の成果に対するフィードバックを、他者に求める。	1	2	3	4	5
16 私は、同僚に助言を求める。	1	2	3	4	5
17 面白そうな企画があるときには、私は、積極的にプロジェクトメンバーとして立候補する。	1	2	3	4	5
18 仕事で新しい発展があれば、私は、いち早くそれを調べ、自ら試してみる。	1	2	3	4	5
19 今の仕事であまりやることがないときは、私は、新しいプロジェクトを始めるチャンスととらえる。	1	2	3	4	5
20 私は、金銭的な報酬が追加されなくても、自分に課された以上の仕事を率先してこなしている。	1	2	3	4	5
21 私は、職務の様々な側面のつながりをよく考えながら、自分の仕事がさらに挑戦しがいのあるようにしている。	1	2	3	4	5

【下位尺度と該当項目】

構造的な（仕事の）資源の向上：1～5

妨害的な（仕事の）要求度の低減：6～11

対人関係における（仕事の）資源の向上：12～16

挑戦的な（仕事の）要求度の向上：17～21