Needs-Based Job Crafting: Validation of a New Scale Based on Psychological Needs

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We present the conceptualization and validation of the Needs-Based Job Crafting Scale (NJCS), a new assessment tool theoretically grounded in the Identity-Based Integrative Needs Model of Crafting and DRAMMA psychological needs (detachment, relaxation, autonomy, mastery, meaning, and affiliation). The article is composed of three studies. In Study 1, we develop the NJCS and test its factorial structure using a cross-sectional sample of Finnish employees ($N = 578$). In Study 2, we validate the factor structure and test the scale for measurement invariance across time with longitudinal samples from Finland ($N = 578$) and Japan ($N = 228$). In Study 3, we examine the convergent, criterion, and incremental validity using a sample of German and Swiss employees ($N = 1,101$). The results confirm a six-factor structure of the scale as defined by the detachment, relaxation, autonomy, mastery, meaning, and affiliation needs in all three samples. The NJCS showed convergent validity when correlated with the conceptually related Needs-Based Off-Job Crafting Scale (NOCS), a job crafting scale based on the job demands–resources (JD-R) model, and the Proactive Personality Scale. Further, the six job crafting dimensions explain a large amount of variance in work engagement, job satisfaction, burnout, and psychological needs satisfaction; thus, supporting criterion validity of the scale. Finally, the NJCS explains variance beyond the existing JD-R based job crafting scale in work engagement, job satisfaction, burnout, and recovery experiences; thus, supporting incremental validity of the NJCS. Together with the existing NOCS, the NJCS facilitates the examination of crafting dynamics within and across work and nonwork life domains, applying a shared theoretical framework of psychological needs.

Keywords: needs-based job crafting scale, integrative needs model of crafting, psychological needs, work engagement, burnout

Supplemental materials: https://doi.org/10.1037/ocp0000372.supp

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Job crafting refers to employees' proactive, intentional, and goal-oriented behaviors to align their job with their own needs, skills, and preferences. Since the introduction of the concept (Wrzesniewski & Dutton, 2001), job crafting research has rapidly evolved generating multiple theoretical conceptualizations and quantitative scales to measure different crafting strategies and areas of crafting (see Tims et al., 2022, for a review). Currently, the predominant quantitative measures of job crafting are based on the job demands–resources (JD-R) model (e.g., Bindl et al., 2019; Petrou et al., 2012; Tims et al., 2012). Although these scales are well-suited for assessing specific behavioral job crafting strategies, they present challenges in capturing a broader range of employee proactive efforts and in extending their applicability beyond the workplace context.

A new line of crafting research proposes a different approach that studies crafting in a holistic way through the lens of psychological needs. Our study builds on this theoretical development with an aim to enrich the theoretical ground of current job crafting research with a psychological needs perspective. The Identity-Based Integrative Needs Model (de Bloom et al., 2020) defines crafting as proactive efforts that are intrinsically motivated and directed toward psychological needs satisfaction. In contrast to approaches that primarily consider external factors and stimuli such as job demands and resources, this model places an emphasis on individual psychological needs as the intrinsic motivational forces behind employees' crafting efforts. Our study applies this model to introduce the Needs-Based Job Crafting Scale (NJCS), a quantitative measure to empirically assess needs-based crafting within the workplace context. The NJCS complements the existing Needs-Based Off-Job Crafting Scale (NOCS) that is a valid measure of needs-based crafting in the nonwork domain (Kujanpää et al., 2022). Together with the NOCS, we provide a set of instruments that enable researchers to study crafting across work and nonwork domains within the same overarching theoretical framework of psychological needs.

In the theoretical part, we outline the evolution of job crafting research highlighting some challenges associated with current approaches. We provide a rational for the NJCS and introduce in detail the theoretical foundation of the scale. The empirical part of the article consists of three substudies. In Study 1, we describe the development of the NJCS and its factorial structure tested in a cross-sectional sample of Finnish employees. In Study 2, we validate the factor structure and test the scale for measurement invariance across time with two longitudinal samples from Finland and Japan. In Study 3, we examine the convergent, criterion, and incremental validity using a large cross-sectional sample of German and Swiss employees.

Job Crafting Research: Overview of the Main Approaches

Proactive behaviors on the part of employees which could be labeled as job crafting were described already in the late 1980s:

> Finally, employees may on occasion redesign their jobs on their own initiative—either with or without management assent and cooperation … responding to a poor person-job fit by changing their jobs to achieve higher congruence between what they do at work and their own skills and needs. (Kulik et al., 1987, p. 292)

However, it took more than a decade for the concept of job crafting to be formally introduced and defined by Wrzesniewski and Dutton (2001) as "the self-initiated cognitive and physical changes individuals make in the task or relational boundaries of their work" (p. 179). The authors proposed three possible crafting strategies that employees may use when their needs are not met in their current job—altering the type or the number of tasks they do at work, the relationships they engage in at work, or changing the way they think about their work to make it personally more meaningful and attractive. In this way, employees can proactively shape their work environment and thus increase their motivation, job satisfaction, and the perceived meaningfulness of their work. Initial job crafting research predominantly relied on qualitative methodologies to investigate various forms of crafting efforts (Berg, Wrzesniewski, et al., 2010; Lyons, 2008). Another decade elapsed before a quantitative measure, the Job Crafting Questionnaire (JCQ; Slemp & Vella-Brodrick, 2013), was developed to empirically assess the three job crafting strategies proposed by Wrzesniewski and Dutton (2001).

A tipping point in the uptake of job crafting in occupational research occurred when the concept was embedded into the JD-R model (Bakker & Demerouti, 2017; Tims & Bakker, 2010). Job crafting added a bottom–up job design perspective to the earlier version of the JD-R model (Bakker & Demerouti, 2007; Demerouti et al., 2001), reflecting that employees can proactively align their job demands and job resources with their skills and needs to achieve a better person–job fit (Tims & Bakker, 2010). One of the core assumptions of the model is that employees may proactively alter their jobs to gain job resources which in turn increases their work engagement leading to a so-called gain spiral (Bakker & Demerouti, 2017). Later, Tims et al. (2012) introduced the Job Crafting Scale (JCS) to empirically assess specific job crafting behaviors based on the JD-R model. The scale covers four job crafting strategies: increasing structural resources, increasing social resources, increasing challenging demands, and decreasing hindering demands. To date, the JCS has been the most popular measure used in job crafting research as reflected in a recent review (Tims et al., 2022) and a meta-analysis (Rudolph et al., 2017) of job crafting studies. Most empirical studies have focused on the role of job crafting in the gain spiral as proposed in the JD-R model (Bakker & Demerouti, 2017). The expected positive association between job crafting and work engagement has mostly been found; however, the evidence on the different crafting strategies and the direction of the relationship has been inconsistent (see Mäkikangas, 2018, for an overview).

There have been efforts to synthesize the two main theoretical conceptualizations of job crafting (i.e., Tims & Bakker, 2010; Wrzesniewski & Dutton, 2001) along a higher order job crafting factor called approach–avoidance crafting (Zhang & Parker, 2019) or promotion–prevention crafting (Bindl et al., 2019). Both constructs reflect the underlying motivations driving job crafting efforts. The term approach/promotion-oriented crafting reflects employee motivation to enhance positive states, while avoidance/prevention-oriented crafting reflects employee motivation to mitigate negative states. In the hierarchical model, Zhang and Parker (2019) proposed a three-level structure with approach and avoidance crafting orientation as the first level, behavioral and cognitive form of crafting as the second level, and the job demands and resources as the third level reflecting the content of job crafting. Combining the three levels results in eight possible job crafting strategies (e.g., approach behavioral crafting of resources, avoidance cognitive crafting of demands, etc.). Lopper et al. (2024) have recently

proposed a new 40-item scale structured along the hierarchical model (Zhang & Parker, 2019) to assess the eight job crafting strategies.

Bindl et al. (2019) differentiated between promotion- and prevention-oriented job crafting and specified additional four job crafting strategies derived from Wrzesniewski and Dutton's (2001) job crafting conceptualization: relationship, skill, task, and cognitive crafting. They proposed a 28-item quantitative scale with items partly based on the existing job crafting scales (Leana et al., 2009; Slemp & Vella-Brodrick, 2013; Tims et al., 2012) that are categorized along the eight job crafting strategies. Namely, promotion–prevention orientation as the first order, and relationship, skill, task, and cognitive crafting as the second order. In addition, they propose the self-determination theory (Ryan & Deci, 2000) to explain why individuals engage in specific job crafting strategies. Both integrative job crafting scales (Bindl et al., 2019; Lopper et al., 2024) represent an important contribution to the crafting research. However, like the existing JD-R based job crafting scales (e.g., Petrou et al., 2012; Tims et al., 2012), the items mostly refer to predefined crafting strategies which limits the applicability of the scales to groups of employees for which these behaviors do not apply. Also, covering only work-specific crafting strategies limits the adaptability of the scales beyond the workplace context, which is an increasingly important topic in crafting research that we address in the following section.

Crafting Research Beyond the Work Domain

With the increasing digitalization and flexibility of work arrangements, the work and the nonwork domains increasingly interact and affect each other. Actions and experiences in employees nonwork domain can significantly influence their actions and experiences in their work domain, and vice versa (Sonnentag et al., 2017). Consequently, the importance of crafting for individual well-being and job performance extends beyond the work domain. However, the existing job crafting conceptualizations (e.g., Bindl et al., 2019; Tims et al., 2012; Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019) present challenges in their applicability beyond the work domain due to their firm definition within the workplace context. As a result, scholars have developed new crafting concepts and quantitative measures to capture employee crafting efforts in different nonwork contexts. The most prominent concepts are leisure crafting (Petrou & Bakker, 2016) and home crafting (Demerouti et al., 2020).

Leisure crafting was originally coined as proactive efforts to create opportunities for experiencing states of enjoyment and meaning during leisure (Berg, Grant, et al., 2010). The concept was later adapted and used to develop a quantitative scale to examine leisure crafting as a mechanism to compensate for high job strain and a lack of opportunities for resource-based job crafting (i.e., JCS; Petrou & Bakker, 2016). However, the joint application of the leisure crafting scale and the JCS (Tims et al., 2012) is rather challenging as they are based on different underlying theoretical assumptions. While job crafting within the JD-R model aims at improving person–job fit, (Tims & Bakker, 2010), the purpose of leisure crafting (Petrou & Bakker, 2016) is the satisfaction of basic psychological needs (Ryan & Deci, 2000).

Demerouti et al. (2020) examined home crafting in relation to job crafting by adapting the JCS (Petrou et al., 2012) to the home domain. The authors thus explored the mechanisms of spillover and compensation between the work and home domains applying the JD-R model (i.e., work/home demands–resources). While the study was an important step forward for crafting research beyond the work domain, home crafting is limited to specific behaviors in the home environment (e.g., family and household tasks) which only partially captures the broad spectrum of the nonwork roles and contexts (e.g., leisure time, voluntary work).

Consequently, crafting research encompassing more than the work domain has been conceptually fragmented and not well-connected to job crafting research. Existing studies usually focus on crafting within a specific life domain and context (i.e., job, career, leisure, home) which prevents the examination of shared underlying motives, mechanisms, and outcomes of crafting efforts across life domains. A new line of integrative crafting research addresses this challenge by proposing psychological needs as the fundamental motivators of crafting efforts within and across work and nonwork life domains (de Bloom et al., 2020). This approach shifts the focus from specific crafting behaviors in one domain to the recognition of psychological needs as the driving and rewarding forces behind crafting efforts in both life domains. In the following section, we provide an in-depth description of the needs-based approach to crafting that represents the theoretical foundations of our NJCS.

Needs-Based Job Crafting: Psychological Needs at the Core of Employee Proactive Efforts

Psychological needs are intrinsic motivational forces of human behavior that transcend and unite life domains and integrate individual motives and efforts (Ryan & Deci, 2000). The theoretical link between crafting and psychological needs was introduced in the Identity-Based Integrative Needs Model of Crafting (de Bloom et al., 2020), which defines crafting as "substantial behavioral and cognitive changes individuals deliberately apply to their roles to satisfy their psychological needs" (de Bloom et al., 2020, p. 4). The mechanism behind crafting is explained by the two-process model (Sheldon, 2011), which sees psychological needs as motivational systems that both motivate and reward behaviors. Perceived needs discrepancy is the motivational component of crafting efforts, while needs satisfaction is the experiential reward of a successful crafting process (de Bloom et al., 2020). The model defines psychological needs along the approach–avoidance distinction as proposed by Green et al. (2017). Approach needs relate to positive states, self-development, and the creation of new resources such as desire to learn a new skill or feel socially connected. Avoidance needs focus on avoiding negative states such as desire to decrease the level of mental and/or physical effort or to reduce sensory stimulation. Perceived discrepancy in psychological needs is at the onset of the crafting process and triggers either approach-oriented or avoidance-oriented crafting efforts. Approach-oriented crafting efforts aim at enhancing desirable aspects of work or nonwork roles to satisfy psychological needs, whereas avoidance-oriented crafting efforts aim at avoiding or reducing the negative aspects of work or nonwork roles to satisfy psychological needs (de Bloom et al., 2020).

The model thus reflects that crafting occurs across both work and nonwork life domains, different roles and identities (e.g., employee, parent, community member), but in all cases is motivated by domain-transcending psychological needs. This has two important implications. First, psychological needs reflect the intrinsic motivation of employee crafting efforts. This adds a new perspective to the

existing crafting conceptualizations (e.g., Demerouti et al., 2020; Tims et al., 2012) which predominantly target domain- and context-specific stimuli with predefined crafting behaviors. By shifting the focus to psychological needs as generic motivational forces, the needs-based approach thus captures a broader range of possible crafting efforts that are relevant for employees within and across domains. In addition, it reflects that employees may engage in different crafting efforts in the work and nonwork domain to address the same psychological need. For example, to fulfill the need for affiliation, one might organize a family event as a spouse or, as an employee, engage in a social event organized by the company. The needs-based approach thus enables the investigation of conceptual mechanisms such as spillover, compensation, and conflict in psychological needs satisfaction across life domains (Edwards & Rothbard, 2000).

Second, by shifting the focus of crafting to intrinsic psychological needs, the model reflects individual differences as to which activities are directed at which specific needs (de Bloom et al., 2020). For example, one employee may join a new project to develop a new skill (i.e., job crafting for mastery), while another employee may join the same project to make new connections with colleagues (i.e., job crafting for affiliation). Also, within an individual the motivation to engage in the same behavior might change over time. The needs-based approach thus emphasizes the goal-oriented nature of crafting and the importance of employee intrinsic motivation for job crafting, rather than focusing on predefined behavioral actions as these can have different purpose across employees and/or situations.

In sum, the integrative model expands work domain-oriented models of crafting (Bindl et al., 2019; Tims & Bakker, 2010; Wrzesniewski & Dutton, 2001; Zhang & Parker, 2019) by proposing a holistic approach to crafting based on the assumption that crafting occurs across all identity domains and the satisfaction of psychological needs is the underlying psychological mechanism explaining why individuals craft and why crafting efforts lead to certain outcomes (de Bloom et al., 2020). To define the specific psychological needs that are in the center of employee crafting efforts, we refer to DRAMMA needs as proposed by Newman et al. (2014).

DRAMMA Psychological Needs

There are several influential theories of psychological needs that aim to explain the motivation behind human behavior (e.g., Csikszentmihalyi, 1990; Frankl, 1969; Meijman & Mulder, 1998; Ryan & Deci, 2000; Sonnentag & Fritz, 2015). Each theory highlights different need(s), however, they all share the core idea that the fulfillment of psychological needs is beneficial for human well-being (e.g., Ryan & Deci, 2000; Tay & Diener, 2011). This core idea is reflected in the DRAMMA model of psychological needs which integrates existing needs theories and defines six psychological needs as the core motivational mechanisms (Newman et al., 2014). Namely, DRAMMA stands for detachment, relaxation, autonomy, mastery, meaning, and affiliation. Detachment refers to mentally disengaging from work-related thoughts and tasks during employees' off-job time (Sonnentag & Bayer, 2005). Relaxation refers to activities with low levels of activation and high positive affect (Sonnentag & Fritz, 2007). Autonomy refers to a sense of being in control of one's actions and choices (Ryan & Deci, 2008). Mastery refers to optimal challenges that stimulate a sense of achievement, competence, and flow (Csikszentmihalyi, 1990;

Newman et al., 2014). Meaning refers to feelings of having opportunities to invest energy in something personally purposeful or valuable in life (Steger & Kashdan, 2013). Affiliation refers to feelings that one is being closely related and emotionally connected to others (Baumeister & Leary, 1995).

The DRAMMA needs align with the approach–avoidance distinction of the integrative needs model (de Bloom et al., 2020). Detachment and relaxation can be categorized as avoidance needs as they generally aim at reducing physical and/or mental strain and prevent negative outcomes. Autonomy, mastery, meaning, and affiliation (AMMA) can be categorized as approach needs as they generally aim at self-development and creation of resources. Newman et al. (2014) conceptualized DRAMMA needs as the key mechanisms how leisure promotes subjective well-being. Accordingly, DRAMMA needs satisfaction has been linked to positive outcomes such as vitality, life satisfaction, and low levels of stress (Kujanpää et al., 2021). As the fulfillment of psychological needs is beneficial for outcomes across life domains (Milyavskaya & Koestner, 2011), we propose that DRAMMA needs are equally relevant for work-related well-being. Needs-based job crafting thus promotes positive outcomes in the work domain (e.g., work engagement) via DRAMMA psychological needs satisfaction. In the following empirical section composed of three interrelated studies, we describe the development and validation of the NJCS.

Study 1: Scale Development and Exploratory Factor Analysis

The aim of the first study was to develop the NJCS and to test its factorial structure. For both steps, we build on earlier work (Kujanpää et al., 2022), which applied the integrative needs model (de Bloom et al., 2020) and DRAMMA psychological needs (Newman et al., 2014) to develop the concept of off-job crafting and to validate the NOCS. The authors defined off-job crafting as proactive and self-initiated efforts in the nonwork domain focused on psychological needs satisfaction. They developed an 18-item six-dimensional NOCS that empirically captures employee proactive efforts for DRAMMA needs satisfaction in multiple aspects of the nonwork domain. We aimed to develop a compatible scale which measures employee proactive efforts for DRAMMA needs satisfaction in the work domain. In line with Kujanpää et al. (2022), we expected to empirically identify a six-dimensional scale following the structure of the DRAMMA psychological needs.

Method

Scale Development

Kujanpää et al. (2022) developed the NOCS following a deductive and theory-driven approach (Hinkin, 1998) grounded in the Identity-Based Integrative Needs Model of Crafting (de Bloom et al., 2020). They generated an initial pool of 36 items which reflect employee proactive efforts in the nonwork domain (e.g., "I've planned/arranged/organized my off-job time") to satisfy DRAMMA psychological needs (e.g., "so that I experience proficiency in the things I undertake"). The items were further refined during qualitative interviews with employees from Finland and Japan. In the next step, the 36-item scale was empirically tested using exploratory factor analysis resulting in the final 18-item version of

the scale (for detailed information on the NOCS development, see Kujanpää et al., 2022). We adapted the resulting 18 items of the NOCS to the work context so that the items of the NJCS closely mirror the items of the NOCS. Items of the NJCS focus on the proactive changes in the work domain to enhance DRAMMA needs satisfaction. Three items per dimension reflect the six psychological needs: job crafting for detachment (e.g., "I've organized my work so that I detach from work-related thoughts during off-job time"), job crafting for relaxation (e.g., "I've planned my work so that I experience relaxation of my body and/or mind during off-job time"), job crafting for autonomy (e.g., "I've planned my work so that I experience control"), job crafting for mastery (e.g., "I've arranged my work so that I experience proficiency in the things I undertake"), job crafting for meaning (e.g., "I've organized my work so that I achieve a sense of purpose in what I am doing"), and job crafting for affiliation (e.g., "I've made sure to experience close connections to the people around me at work"). The response options of the scale range from 1 = *never* to 5 = *very often*. The scale includes an introductory text which describes the meaning of job crafting and provides a few guiding examples. All language versions of the NJCS used in our study (i.e., Finnish, Japanese, and German) as well as the original English version are available as Supplemental Material.

Participants

We collected cross-sectional data from Finnish employees in September 2018. Inclusion criteria were as follows: being of adult age (18+ years old) and working a minimum of 24 hr per week. Participants were recruited via the human resources departments of mainly public organizations using convenience sampling. As an incentive, participants received individualized feedback based on their data after the data collection was finished. A total of 578 employees completed the questionnaire; the majority (85%) of the participants were female, mean age was 51.4 (SD = 10.23), and half of the participants (50%) had a college or university level of education. Participants worked an average of 39 hr per week, mainly in health care or social services (46%), public administration (20%), and education (11%).

Statistical Analysis

Data analysis in all three studies was carried out using R Version 4.0.2 (R Core Team, 2022). To test whether the six-factor structure could be distinguished, we performed principal component analysis (maximum likelihood estimation) with oblique rotation using efa function from psych package (Revelle, 2016). Factors with an eigenvalue higher than one were retained. In addition, we retained only items with factor loadings above 0.35 on the expected factor (Costello & Osborne, 2005; Floyd & Widaman, 1995).

Results

Exploratory factor analysis identified a six-factor structure of the scale. Together, the six factors explained 74% of variance. The first factor (eigenvalue = 2.55) formed by the items for affiliation explained 14% of the variance. The second factor (eigenvalue = 2.50) formed by the items measuring detachment explained 14% of the variance. The third factor (eigenvalue = 2.46) formed by the

items for relaxation explained 14% of the variance. The fourth factor (eigenvalue = 2.39) formed by the items for meaning explained 13% of the variance. The fifth factor (eigenvalue = 1.74) formed by the items for autonomy explained 10% of the variance. Finally, the sixth factor (eigenvalue = 1.59) formed by the items for mastery explained additional 9% of the variance. Cronbach's α ranged from 0.77 (*mastery*) to 0.93 (*detachment*), showing good reliability for all six dimensions. Table 1 shows means, standard deviations, and factor loadings of the items.

Conclusion of Study 1

In Study 1, we tested the factor structure of the Finnish version of the NJCS. The results support the six-factor structure of the 18-item scale according to the six DRAMMA needs with three items per dimension. The six factors explain 74% of variance; the dimensions affiliation, detachment, and relaxation explained the highest proportion of variance. All six dimensions of the scale showed good internal consistency.

Study 2: Confirmatory Factor Analysis and Measurement Invariance

In Study 2, we further examined the six-factor structure of the scale in two culturally different samples from Finland and Japan. We used confirmatory factor analysis to test the six-factor model of the scale against three theoretically meaningful alternative models: a one-factor model, a two-factor model (detachment and relaxation as avoidance needs factor; AMMA as approach needs factor), and a five-factor model (detachment and relaxation as avoidance needs factor; AMMA as four separate factors). We expected that the six-dimensional model would fit the data better than the three alternative models. Additionally, we collected three waves of data in each country to test measurement invariance of the scale across time. We expected that the scale would reach scalar measurement invariance in both samples.

Method

Participants

We collected longitudinal data from Japanese employees at three time points with 3-month time lags using the same inclusion criteria as in Study 1. Data collection of the first wave occurred in December 2018. Participants were recruited through a consultancy agency with established contacts to various Japanese companies using convenience sampling. As an incentive, participants received individualized feedback based on their data. In total, 228 employees participated in the first wave and 109 completed all three waves (55% participation). The sample included more males (63%) than females, mean age was 33.6 years (SD = 6.48), and 95% had a college or university qualification. Participants worked mainly in information technology (57%) and worked an average of 48.3 hr per week ranging from 24 to 80 hr.

Further, we collected two additional waves of data from the Finnish employees participating in Study 1. The first wave of data collection occurred in September 2018, and we used a 3-month time lag for Wave 2 and Wave 3. A total of 578 employees who participated in the first wave (Study 1) were invited and 292 completed the additional two waves (50.5% participation).

Table 1

Exploratory Factor Analysis

Item	M	SD	1	2	3	4	5	6
I've organized my work so that I detach from work-related thoughts during off-job time.	3.55	1.09	0.77					
I've arranged my work so that I distance myself from work-related tasks during off-job time.	3.66	1.06	0.99					
I've organized my work so that I switch off from work duties during off-job time.	3.77	1.05	0.78					
I've planned my work so that I experience relaxation of my body and/or mind during off-job time.	3.47	1.05		0.77				
I've planned my work so that I get relief from stress during off-job time.	3.42	1.04		0.84				
I've arranged my work so that I get some rest during off-job time.	3.65	1.02		0.80				
I've planned my work so that I experience control.	3.44	1.03			0.57			
I've organized my work so that I determine my own course of action.	3.19	1.06			0.95			
I've made sure the things I do at work reflect what I really want in my job.	3.23	1.02			0.43			
I've arranged my work so that I experience proficiency in the things I undertake.	3.85	0.79				0.44		
I've planned my work to familiarize myself with new ideas, expand my knowledge or interests at work.	3.30	0.98				0.69		
I've organized my work so that I put my skills, knowledge or abilities into action at work.	3.86	0.87				0.58		
I've made sure to experience meaning in my work.	3.70	0.98					0.78	
I've organized my work so that I achieve a sense of purpose in what I am doing.	3.72	0.99					0.94	
I've arranged my work so that the things I do at work align with my personal values.	3.61	1.03					0.39	
I've made sure to experience close connections to the people around me at work.	3.60	0.95						0.92
I've arranged my work so that I feel a sense of belongingness to the people at work.	3.59	0.96						0.95
I've planned my work so that I feel related to those around me at work.	2.93	1.13						0.70

Note. $N = 578$; only loadings > 0.30 are shown; response options: 1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *very often*.

Most of the participants were female (85%), mean age was 52.3 years ($SD = 10.3$), and 51% had a college or university education.

Measures

Needs-based job crafting was measured with the 18-item NJCS as reported in Study 1. In the Finnish sample, Cronbach's αs of the six dimensions ranged from 0.78 (*mastery*) to 0.93 (*detachment*). In the Japanese sample, Cronbach's αs of the six dimensions ranged from 0.78 (*mastery*) to 0.94 (*relaxation*).

Statistical Analysis

To test the six-factor structure of the scale, we performed confirmatory factor analysis separately for both samples using the first wave of data collection. We used the cfa function from the lavaan package (Rosseel, 2012). To test measurement invariance across time, we followed a similar procedure fitting two longitudinal models separately for the Finnish and Japanese samples. Both models were estimated using full information maximum likelihood estimator (FIML). The FIML procedure is strongly recommended as it has a high parameter and model fit estimation efficiency in the case of time-specific dropouts, even in case of up to 50% attrition in sample size (Enders & Bandalos, 2001). We assessed the model fit using the comparative fit index (CFI), root-mean-square error of approximation (RMSEA), and standardized root-mean-square residual (SRMR) with conventional cut-off values. The goodness-of-fit values for CFI surpassing 0.90 indicate an acceptable fit and

exceeding 0.95 indicate a good fit (Bentler & Bonett, 1980). A value under 0.08 for RMSEA and SRMR indicates a good fit (Beauducel & Wittmann, 2005). The models were compared using chi-square difference tests. We compared the six-factor model to three alternative models: one-factor, two-factor (detachment and relaxation as avoidance needs factor; AMMA as approach needs factor), and five-factor (detachment and relaxation as avoidance needs factor; AMMA as four separate factors). We used the same fit indices and cut-off values to test the scale for configural, metric (i.e., factor loading fixed to be equal), and scalar (i.e., factor loadings and intercepts fixed to be equal) measurement invariance.

Results

Confirmatory Factor Analysis

The fit of the six-factor model was significantly better than all three alternative models in both samples (see Table 2). The goodness-of-fit indices of the model were good in both samples (CFI > 0.95, RMSEA and SRMR < 0.08). We can thus conclude that the six-factor model was the best representation of the observed data in both samples.

Measurement Invariance Test

The configural fit was good in both samples (Finland: CFI = 0.955; RMSEA = 0.07, SRMR = 0.05; Japan: CFI = 0.947; RMSEA = 0.08, SRMR = 0.06), so we proceeded with metric

Table 2
Confirmatory Factor Analysis and Measurement Invariance Across Time

Model	χ^2	df	CFI	RMSEA	SRMR	M comparison	$\Delta\chi^2$	Δdf
			Finland ($N = 578$)					
Confirmatory factor analysis								
M1 one-factor	3132.7	135	0.528	0.222	0.152			
M2 two-factor	1718.1	134	0.751	0.162	0.100	M1 versus **M2**	1414.6***	1
M3 five-factor	842.9	125	0.887	0.113	0.073	M2 versus **M3**	875.1***	9
M4 six-factor	399.6	120	0.956	0.072	0.052	M3 versus **M4**	443.4***	5
Measurement invariance								
M4a configural invariance	1125.1	360	0.955	0.073	0.051			
M4b metric invariance	1152.8	384	0.955	0.070	0.055	M4a versus M4b	27.8[a]	24
M4c scalar invariance	1170	408	0.955	0.068	0.055	M4b versus M4c	17.4[a]	24
			Japan ($N = 228$)					
Confirmatory factor analysis								
M1 one-factor	1491.1	135	0.435	0.225	0.242			
M2 two-factor	738.6	134	0.748	0.151	0.102	M1 versus **M2**	752.4***	1
M3 five-factor	404.2	125	0.884	0.106	0.071	M2 versus **M3**	334.4***	9
M4 six-factor	247.9	120	0.947	0.073	0.065	M3 versus **M4**	156.3***	5
Measurement invariance								
M4a configural invariance	688.8	360	0.947	0.078	0.058			
M4b metric invariance	713.9	384	0.947	0.076	0.061	M4a versus M4b	25.2[a]	24
M4c scalar invariance	737.7	408	0.947	0.074	0.062	M4b versus M4c	23.7[a]	24

Note. Superior models are printed in bold. M = model; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual.
[a] Not significant.
*** $p < .001$.

invariance in which the factor loadings were constrained to be equal across the three time points. The model fit was good and there was no significant difference between the configural and metric models (Finland: $\Delta\chi^2 = 27.8$, $\Delta df = 24$, $p = .35$; Japan: $\Delta\chi^2 = 25.2$, $\Delta df = 24$, $p = .40$). Finally, we tested for scalar invariance where factor loadings and intercepts were fixed to be equal across the three time points. The fit indices were good and the model did not significantly differ from the metric model (Finland: $\Delta\chi^2 = 17.4$, $\Delta df = 24$, $p = .77$; Japan: $\Delta\chi^2 = 23.7$, $\Delta df = 24$, $p = .48$). The NJCS thus reached scalar measurement invariance in both samples. See Table 2 for details.

Conclusion of Study 2

In Study 2, we tested the six-factor structure of the NJCS against three alternative models in two culturally different samples from Japan and Finland. Further, we tested measurement invariance of the scale in both samples using three waves of data. The six-factor structure of the scale showed the best fit to the data in both samples. Moreover, the scale reached scalar measurement invariance across time in both samples. Therefore, the results support the six-factor structure of the scale as well as its measurement invariance across time.

Study 3: Convergent, Criterion, and Incremental Validity

In this study, we examined the convergent, criterion, and incremental validity of the scale. We tested the convergent validity of the NJCS in relation to the NOCS (Kujanpää et al., 2022), which is a measure of needs-based crafting in the nonwork domain. Further, we expected the NJCS to show convergent validity with the existing JCS based on the JD-R model (Petrou et al., 2012; Tims

et al., 2012), and with proactive personality (Crant, 1995) as the NJCS refers to proactive behaviors toward need satisfaction.

To test criterion validity, we examined the predictive value of the six dimensions of the NJCS for meaningful consequential outcomes, namely work engagement, job satisfaction, burnout, and psychological needs satisfaction in terms of recovery experiences, self-determination theory (i.e., autonomy, relatedness, competence), and meaning. We expected that crafting for avoidance needs satisfaction (i.e., detachment and relaxation) would be relevant for recovery experiences and burnout and that crafting for approach needs satisfaction (i.e., AMMA) would be relevant for work engagement, job satisfaction, self-determination theory, and meaning (Green et al., 2017).

Finally, to test incremental validity, we examined the additional explained variance of the NJCS compared to the JCS (Petrou et al., 2012; Tims et al., 2012) in work engagement, job satisfaction, recovery experiences, and burnout. Work engagement is driven by positive emotions generated via needs satisfaction (Green et al., 2017). Proactively increasing needs satisfaction can thus energize workers and increase their work engagement. Furthermore, the satisfaction of DRAMMA psychological needs has been linked to outcomes such as life satisfaction, vitality, recovery experiences, and low levels of stress (Kujanpää et al., 2021). Thus, we expected that the NJCS would explain variance beyond the JCS in work engagement, job satisfaction, recovery experiences, and burnout.

Method

Participants

We collected cross-sectional data from a large sample of German and German-speaking Swiss employees. Inclusion criteria were

as follows: being employed, working more than 20 hr per week, and being within the age range of 18–65 years. Participants were recruited through the panel data service provider Respondi using quota sampling based on the sociodemographic characteristics of our target population. Data were collected via an online questionnaire administered between May and June 2022. Participation was rewarded with a minimal incentive (i.e., points that could be used to access a given service after completing several surveys). Each participant in the online panel service database had a unique code that ensured anonymity and prevented multiple submissions from one participant. Several disqualifying items (e.g., "Please choose number three as an answer to this item") were included as a quality check to exclude participants giving careless responses. In total, we received 1,329 responses, of which 133 were excluded due to eligibility criteria or attention checks and further 95 participants were removed during data cleaning due to suspected careless answers (Meade & Craig, 2012). The final sample included $N = 1,101$ participants. More than half of the sample were males (56%), mean age was 48.9 years ($SD = 10.1$), 4% had completed primary, 61% secondary, and 35% tertiary education. Participants came from a wide range of occupations including health care, social work, retail, production of goods, information technology, finance and insurance, education, hospitality, and construction. According to the sociodemographic characteristics, the sample was a good representation of the general population of German and Swiss employees.[1]

Measures

Needs-based job crafting was measured with the 18-item NJCS as reported in Study 1. Cronbach's αs of the six dimensions ranged from 0.69 (*autonomy*) to 0.92 (*detachment*).

Needs-based off-job crafting was measured with the 18-item NOCS (Kujanpää et al., 2022). The items measure the extent to which people proactively seek to satisfy their psychological needs during their nonwork time on a Likert-type scale ranging from 1 = *never* to 5 = *very often*. The scale is based on the six dimensions of the DRAMMA model (Newman et al., 2014) and includes three items per dimension: crafting for detachment (e.g., "I've arranged my off-job time so that I distance myself from work-related tasks"), crafting for relaxation (e.g., "I've planned my off-job activities so that I get relief from stress"), crafting for autonomy (e.g., "I've planned my off-job activities so that I experience control over my life"), crafting for mastery (e.g., "I've arranged my off-job time so that I experience proficiency in the things I undertake"), crafting for meaning (e.g., "I've organized my off-job activities so that I achieve a sense of purpose in what I am doing"), and crafting for affiliation (e.g., "I've made sure to experience close connections to the people around me during off-job time"). Cronbach's αs of the six dimensions ranged from 0.75 (*crafting for autonomy*) to 0.91 (*crafting for detachment*).

JD-R-based job crafting was assessed using a 17-item scale which was a combination of the JCS developed by Tims et al. (2012) and Petrou et al. (2012). The dimensions increasing structural job resources (e.g., "I try to learn new things at work") and increasing social job resources (e.g., "I ask colleagues for advice") were measured using the 10 items from Tims et al. (2012). However, the dimensions increasing challenging demands and reducing hindering demands of the scale are less suitable for blue-collar workers and less educated employees (Nielsen & Abildgaard, 2012) because

some items refer mainly to mental work or are complicated in their wording (e.g., "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"; "I try to make my work more challenging by examining the underlying relationships between aspects of my job"). As the present study is based on a very broad sample of different occupational groups including blue-collar workers, we used items from the scale developed by Petrou et al. (2012) for the two demands-related dimensions (e.g., "I ask for more responsibilities"; "I make sure my work is physically less intense"). A confirmatory factor analysis of the scale with the four dimensions as latent variables showed an acceptable overall fit ($\chi^2 = 761.2$, $df = 113$, CFI = 0.914, RMSEA = 0.072, SRMR = 0.064). All items were scored on a 5-point scale ranging from 1 = *never* to 5 = *very often*, and we calculated an overall mean score for job crafting. Cronbach's α of the four dimensions ranged from 0.73 (*seeking challenges*) to 0.81 (*increasing structural resources*).

Proactive personality was measured with a six-item version of the Proactive Personality Scale (Bateman & Crant, 1993; Crant, 1995). An example item is "I excel at identifying opportunities." The answering format ranged from 1 = *totally disagree* to 5 = *totally agree*. Cronbach's α of the scale was 0.86.

Work engagement was assessed with the nine-item version of the Utrecht Work Engagement Scale (Schaufeli et al., 2006). The scale measures three underlying dimensions of work engagement: vigor (e.g., "At work, I feel like I am bursting with energy"), dedication (e.g., "I am enthusiastic about my job"), and absorption (e.g., "I am immersed in my work"). The items were scored on a 7-point scale ranging from 0 = *never* to 6 = *always*. We calculated an overall mean score for work engagement. Cronbach's α of the scale was 0.97.

Job satisfaction was measured with a single item "How satisfied are you when you look at your work life as a whole?" The answering format ranged from 1 = *extremely dissatisfied* to 7 = *extremely satisfied*.

Burnout was measured with the seven-item work-related burnout subscale of the 19-item Copenhagen Burnout Inventory (Kristensen et al., 2005). The items capture the degree of physical and psychological fatigue perceived by the person in relation to work (e.g., "Do you feel burnt out because of your work?"). Items were answered on a 5-point scale ranging from 1 = *never/almost never* to 5 = *very often*. We calculated an overall mean score for work-related burnout. Cronbach's α of the scale was 0.92.

Psychological need satisfaction was measured with 18 items in total. For recovery, we used six items from the 16-item recovery experiences questionnaire by Sonnentag and Fritz (2007). We used the dimensions of psychological detachment and relaxation since they are key to lowering demands and restoring the homeostatic balance. Each dimension was measured with three items with the highest factor loading (e.g., "I forget about work"; "I kick back and relax"). The answering format ranged from 1 = *strongly disagree* to 5 = *strongly agree*. We calculated an overall mean score for recovery experiences. Cronbach's α of both dimensions was 0.70. Further, we used nine items of the 12-item basic psychological need satisfaction scale (Chen et al., 2015) which covers the need for autonomy, competence, and relatedness. For each dimension, we used three items with the highest factor loadings (e.g., "Over the past month, I felt a sense of choice and freedom in the things

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I undertake"; "Over the past month, I felt confident that I can do things well"; "Over the past month, I felt that the people I care about also care about me"). Further, we used additional three items to assess the need for meaning which is not covered in the scale by Chen et al. (2015). One item was adapted from Steger et al., (2006; "Over the past month, I felt my life has a clear sense of purpose") and two items were adapted from Kujanpää et al. (2022); e.g., "Over the past month, I experienced meaning in my life"). The answering format ranged from 1 = strongly disagree to 5 = strongly agree. Cronbach's α of the four dimensions ranged from 0.88 for autonomy to 0.93 for relatedness.

Statistical Analysis

Before testing the validity of the scale, we performed confirmatory factor analysis to check the six-factor structure of the scale using the cfa function from the lavaan package (Rosseel, 2012). To test convergent validity, we performed correlation analysis using the overall means of the NJCS, the NOCS, the JCS, and proactive personality. Further, to examine the convergent validity of the separate dimension, we included the means of the six dimensions of the NJCS (i.e., detachment, relaxation, autonomy, mastery, meaning, affiliation) and the means of the four dimensions of the JCS (i.e., increasing structural resources, increasing social resources, seeking challenges, and reducing demands).

To test criterion validity, we fitted eight linear regression models with the means of the six NJCS dimensions as predictors and with work engagement, job satisfaction, burnout, and psychological needs satisfaction (i.e., recovery experiences, autonomy, competence, relatedness, and meaning) as outcome variables. We controlled for age, gender, and level of education in all four models.

Finally, to test incremental validity, we performed a stepwise linear regression analysis using the means of the NJCS and the JCS as predictors of work engagement, job satisfaction, burnout, and recovery experiences. In the first step, we included only the JCS as a predictor, in the second step, we added the NJCS and we compared the total explained variance of the models.

Results

Confirmatory Factor Analysis

The six-factor structure of the scale showed good fit to the data (CFI = 0.979, RMSEA = 0.046, SRMR = 0.036), thus supporting the factorial validity of the six first-order factors corresponding to the dimensions of DRAMMA.

Convergent Validity

We found a significant positive correlation ($r = 0.66$, $p < .001$) between the NJCS and the NOCS, between the NJCS and the JCS ($r = 0.50$, $p < .001$), as well as between the NJCS and proactive personality ($r = 0.49$, $p < .001$). We moreover found significant positive correlations between the six dimensions of the NJCS and the four dimensions of the JCS. Specifically, crafting for detachment and relaxation showed a moderate positive correlation with the JCS dimension reducing demands ($r = 0.20$, $r = 0.24$, $p < .001$). Crafting for autonomy, mastery, and meaning showed a moderately high positive correlation with the JCS dimensions increasing structural resources ($r = 0.57$, $r = 0.65$, $r = 0.55$, $p < .001$). Finally, crafting for affiliation showed a moderately high correlation with the JCS dimension increasing social resources ($r = 0.49$, $p < .001$). See Table 3 for complete results of the correlation analysis.

Criterion Validity

The results of the eight multiple linear regression models are reported in Table 4. The NJCS dimensions explained a significant amount of variance in work engagement, $F(9, 1,091) = 96.5$, $p < .001$, $R^2 = 0.44$. Crafting for autonomy $\beta = 0.08$, $t(1,091) = 2.4$, $p < .05$, mastery $\beta = 0.08$, $t(1,091) = 2$, $p < .05$, meaning $\beta = 0.45$, $t(1,091) = 11.9$, $p < .001$, and affiliation $\beta = 0.17$, $t(1,091) = 5.5$, $p < .001$ were significant predictors explaining the greatest proportion of variance. The NJCS dimensions explained a significant amount of variance in job satisfaction, $F(9, 1,091) = 45.1$, $p < .001$, $R^2 = 0.27$. Crafting for meaning $\beta = 0.32$, $t(1,091) = 7.6$, $p < .001$ and

Table 3
Means, Standard Deviations, and Zero-Order Correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. NJCS	3.62	0.61	—													
2. NOCS	3.77	0.60	.66	—												
3. JCS	3.00	0.51	.50	.24	—											
4. Proactive personality	3.65	0.68	.49	.51	.44	—										
5. NJCS: detachment	3.81	0.93	.65	.59	.10**	.12	—									
6. NJCS: relaxation	3.69	0.90	.70	.60	.17	.20	.81	—								
7. NJCS: autonomy	3.55	0.75	.76	.41	.48	.45	.25	.32	—							
8. NJCS: mastery	3.70	0.72	.79	.44	.52	.50	.29	.35	.74	—						
9. NJCS: meaning	3.58	0.87	.78	.41	.47	.51	.21	.25	.65	.69	—					
10. NJCS: affiliation	3.37	0.92	.70	.42	.48	.44	.17	.23	.47	.51	.66	—				
11. JCS: structural resources	3.76	0.66	.52	.22	.74	.50	.07*	.13	.57	.65	.55	.40	—			
12. JCS: social resources	2.75	0.59	.37	.18	.82	.25	.03ᵃ	.07	.31	.36	.36	.49	.49	—		
13. JCS: increasing challenges	2.36	0.89	.22	.05ᵃ	.73	.21	.01ᵃ	.03ᵃ	.20	.26	.26	.28	.38	.55	—	
14. JCS: reducing demands	2.90	0.73	.30	.24	.60	.31	.20	.24	.29	.18	.18	.19	.24	.28	.27	—

Note. $N = 1,101$. All correlations are significant at $p < .001$, if not indicated otherwise. NJCS = Needs-Based Job Crafting Scale; NOCS = Needs-Based Off-job Crafting Scale; JCS = Job Crafting Scale.
ᵃ p = not significant.
* $p < .05$. ** $p < .01$.

TUŠL ET AL.

Table 4
Multiple Regression Analysis With the Six Dimensions of the NJCS as Independent Variables

	Standardized β of the NJCS dimension						
Variable	D	R	Au	Ma	Me	Af	R^2
Work engagement	−0.07	−0.01	0.08*	0.08*	0.45***	0.17***	0.44
Job satisfaction	0.04	0.03	0.09*	0.04	0.32***	0.10**	0.26
Burnout	−0.27***	0.04	−0.10*	0.01	−0.23***	0.01	0.20
Need satisfaction: recovery	0.46***	0.16***	0.08*	−0.07	−0.06	0.03	0.35
Need satisfaction: autonomy	0.10*	0.09*	0.17***	0.02	0.22***	0.13**	0.30
Need satisfaction: competence	0.10*	−0.05	0.11**	0.34***	0.10*	0.04	0.32
Need satisfaction: relatedness	0.09	0.05	−0.04	0.04	0.15***	0.25***	0.16
Need satisfaction: meaning	0.05	0.06	−0.01	0.06	0.40***	0.12***	0.31

Note. $N = 1,101$. NJCS = Needs-Based Job Crafting Scale; D = detachment; R = relaxation; Au = autonomy; Ma = mastery; Me = meaning; Af = affiliation.
* $p < .05$. ** $p < .01$. *** $p < .001$.

affiliation β = 0.10, $t(1,091)$ = 2.8, $p < .01$ were significant predictors explaining the greatest proportion of variance. The NJCS dimensions explained a significant amount of variance in burnout, $F(9, 1,091)$ = 31.7 $p < .001$, R^2 = 0.20. Crafting for detachment β = −0.27, $t(1,091)$ = −5.8, $p < .001$, autonomy β = −0.10, $t(1,091)$ = −2.4, $p < .05$, and meaning β = −0.23, $t(1,091)$ = −5.2, $p < .001$ were significant predictors explaining the greatest proportion of variance. The NJCS dimensions explained a significant amount of variance in recovery experiences, $F(9, 1,091)$ = 50.4, $p < .001$, R^2 = 0.21. Crafting for detachment β = 0.46, $t(1,091)$ = 11.1, $p < .001$, relaxation β = 0.16, $t(1,091)$ = 3.7, $p < .001$, and autonomy β = 0.08, $t(1,091)$ = 2.0, $p < .05$ were significant predictors explaining the greatest proportion of variance. The NJCS dimensions explained a significant amount of variance in autonomy, $F(9, 1,091)$ = 53.3, $p < .001$, R^2 = 0.30. Crafting for meaning β = 0.22, $t(1,091)$ = 5.3, $p < .001$ and autonomy β = 0.17, $t(1,091)$ = 4.3, $p < .001$ were significant predictors explaining the greatest proportion of variance. The NJCS dimensions explained a significant amount of variance in competence, $F(9, 1,091)$ = 57.9, $p < .001$, R^2 = 0.32. Crafting for

mastery β = 0.34, $t(1,091)$ = 8.3, $p < .001$ and autonomy β = 0.17, $t(1,091)$ = 2.9, $p < .01$ were significant predictors explaining the greatest proportion of variance. The NJCS dimensions explained a significant amount of variance in relatedness, $F(9, 1,091)$ = 25.5, $p < .001$, R^2 = 0.16. Crafting for affiliation β = 0.25, $t(1,091)$ = 6.7, $p < .001$ and meaning β = 0.15, $t(1,091)$ = 3.3, $p < .001$ were significant predictors explaining the greatest proportion of variance. The NJCS dimensions explained a significant amount of variance in meaning, $F(9, 1,091)$ = 56.7, $p < .001$, R^2 = 0.31. Crafting for meaning β = 0.40, $t(1,091)$ = 9.8, $p < .001$ and affiliation β = 0.12, $t(1,091)$ = 3.5, $p < .001$ were significant predictors explaining the greatest proportion of variance.

Incremental Validity

The results of the four multiple stepwise linear regression models are reported in Table 5. The model with the NJCS and the JCS as predictors explained significantly more variance in work engagement, $F(2, 1,098)$ = 248, $p < .001$, R^2 = 0.31, than the

Table 5
Stepwise Regression Analysis With the Means of the JCS and the NJCS as Independent Variables

					95% CI				
Variable	Step	Predictor	Estimate	SE	LL	UL	β	R^2	ΔR^2
Work engagement	1	JCS	1.16	0.08	1.01	1.31	0.41***	0.17	0.14***
	2	JCS	0.55	0.08	0.39	0.70	0.19***	0.31	
		NJCS	1.01	0.07	0.88	1.14	0.44***		
Job satisfaction	1	JCS	0.62	0.06	0.49	0.76	0.26***	0.07	0.16***
	2	JCS	0.09	0.07	−0.05	0.23	0.04	0.23	
		NJCS	0.88	0.06	0.77	0.99	0.46***		
Burnout	1	JCS	−0.12	0.05	−0.22	−0.01	−0.07*	0.004	0.18***
	2	JCS	0.30	0.05	0.19	0.41	0.17***	0.18	
		NJCS	−0.69	0.04	−0.78	−0.60	−0.48***		
Recovery	1	JCS	−0.02	0.05	−0.11	0.07	−0.01	<0.001	0.19***
	2	JCS	−0.42	0.05	−0.52	−0.32	−0.27***	0.19	
		NJCS	0.66	0.04	0.58	0.74	0.51***		

Note. $N = 1,101$. NJCS = Needs-Based Job Crafting Scale; JCS = Job Crafting Scale; SE = standard error; CI = confidence interval; LL = lower limit; UL = upper limit.
* $p < .05$. *** $p < .001$.

model with only the JCS as a predictor, $F(1, 1,099) = 223$, $p < .001$, $R^2 = 0.17$. The model with the NJCS and the JCS as predictors explained significantly more variance in job satisfaction, $F(2, 1,098) = 160$, $p < .001$, $R^2 = 0.23$, than the model with only the JCS as a predictor, $F(1, 1,099) = 83$, $p < .001$, $R^2 = 0.07$. The model with the NJCS and the JCS as predictors explained significantly more variance in burnout, $F(2, 1,098) = 121$, $p < .001$, $R^2 = 0.18$, than the model with only the JCS as a predictor, $F(1, 1,099) = 5$, $p < .05$, $R^2 = 0.004$. The model with the NJCS and the JCS as predictors explained significantly more variance in recovery experiences, $F(2, 1,098) = 135.4$, $p < .001$, $R^2 = 0.19$, than the model with only the JCS as a predictor, $F(1, 1,099) = 0.24$, $p = .63$, $R^2 < 0.001$.

Conclusion of Study 3

In Study 3, we tested convergent, criterion, and incremental validity of the NJCS in a large cross-sectional sample of German and Swiss employees. The NJCS showed convergent validity when correlated with the NOCS, JCS, and proactive personality. Moreover, looking at the separate dimensions of the NJCS and the JCS, crafting for detachment and relaxation correlated positively with reducing hindering demands (i.e., avoidance crafting) and crafting for AMMA correlated positively with increasing structural resources, social resources, and challenging demands (i.e., approach crafting). Regarding criterion validity, the six dimensions of the NJCS explained a large amount of variance in work engagement, job satisfaction, burnout, recovery experiences, and psychological need satisfaction. Finally, we demonstrated the incremental validity of the NJCS which explained a significantly larger proportion of variance in work engagement, job satisfaction, burnout, and recovery experiences than the JCS.

Discussion

The aim of our article was to present a conceptualization, development, and validation of the NJCS. This new scale complements the NOCS (Kujanpää et al., 2022) and together the scales make it possible to study crafting in both the work and the nonwork domain using the same theoretical framework of DRAMMA psychological needs. In the theoretical background, we provided a concise overview of the existing job crafting research and presented the theoretical foundation of the NJCS.

In Study 1, we developed the items of the scale based on the complementary NOCS (Kujanpää et al., 2022), and we tested the factorial structure of the scale using a sample of Finnish employees. In line with our expectations, exploratory factor analysis identified six factors which follow the structure of the DRAMMA psychological needs. In Study 2, we used two longitudinal convenience samples of Finnish and Japanese employees to confirm the six-factor structure of the scale and to present evidence of measurement invariance of the scale across time in two different cultures. In Study 3, we used a large cross-sectional sample of German and Swiss-German employees to examine the validity of the scale. The NJCS showed convergent validity when correlated with the JCS and proactive personality. Moreover, the six dimensions of the NJCS showed convergent validity when correlated with the four dimensions of the JCS. Regarding criterion validity, crafting

for approach needs (AMMA) was significantly related to work engagement with meaning and affiliation explaining the largest amount of variance. This suggests that proactive accumulation of resources at work is positively associated with work engagement as described in the gain spiral of the JD-R model (Bakker & Demerouti, 2017). Crafting for meaning and affiliation also explained the largest amount of variance in job satisfaction. Crafting for detachment and meaning were negatively related to burnout. However, contrary to our expectations, crafting for relaxation was not significantly related to burnout. A similar finding has been reported in a diary study using the DRAMMA needs to explore the effect of break recovery experiences on affective well-being (Virtanen et al., 2021). These findings highlight the importance of psychological detachment for burnout prevention (Sonnentag et al., 2014). Regarding psychological needs satisfaction, crafting for detachment and relaxation (i.e., crafting for avoidance needs) was significantly related to recovery experiences. This result contributes to the research on recovery, suggesting that employees may proactively enhance their recovery experiences via needs-based job crafting (Sonnentag et al., 2022). Finally, crafting for AMMA were significantly related to their respective need satisfaction (i.e., autonomy, competence, meaning, and relatedness). Overall, findings from criterion validity suggest that needs-based job crafting is a relevant strategy both for strengthening motivation and thriving at work as well as for prevention of negative outcomes such as burnout. We also demonstrated the incremental validity of the NJCS in work engagement, job satisfaction, burnout, and recovery experiences compared to the existing JCS (Petrou et al., 2012; Tims et al., 2012). The explained variance almost doubled in work engagement after adding NJCS to the model, and in the case of job satisfaction, the difference was even greater. Interestingly, the JCS alone explained only little variance in burnout and recovery (i.e., 0.1% and 0.4% respectively). After adding NJCS to the model, it explained almost 20% of variance in both outcomes. This indicates that the NJCS captures a broader range of strategies relevant for these outcomes than the JCS which captures only very specific job crafting behaviors (e.g., asking a supervisor for support) that may be less relevant.

Theoretical Contributions

Our study contributes to the theoretical development of crafting research in several ways. First, the NJCS is theoretically grounded in the Identity-Based Integrative Needs Model of Crafting (de Bloom et al., 2020) and DRAMMA psychological needs (Newman et al., 2014) providing a well-defined psychological mechanism for job crafting. Within this framework, psychological needs are the primary focus of job crafting that both motivate and reward employee crafting efforts (de Bloom et al., 2020; Sheldon, 2011). Prior crafting conceptualizations have varied in their treatment of psychological needs. Some have seen them as drivers of crafting behaviors (Bindl et al., 2019; Wrzesniewski & Dutton, 2001), others as mediators between crafting behaviors and positive work outcomes (van Wingerden et al., 2017), or even as outcomes of crafting (Petrou & Bakker, 2016). The NJCS directly integrates psychological needs as the fundamental intrinsic motivational forces that underpin employee job crafting efforts. This integration offers valuable insights into the role of (dis)satisfaction of psychological needs in the crafting process and

how proactive psychological needs satisfaction connects with various outcomes. This is exemplified in the criterion validity analysis conducted in Study 3, where we demonstrate the relevance of proactive satisfaction of different DRAMMA needs for various outcomes.

Second, the needs-based approach shifts focus from externally directed behavioral strategies to employee intrinsic motivation for job crafting. The existing job crafting scales mostly rely on predefined behavioral strategies (e.g., Tims et al., 2012); however, these can be motivated by different goals across employees and/or situations. The NJCS brings a new perspective reflecting that there may be individual differences on the intrinsic level as to which proactive efforts are motivated by which specific psychological needs (de Bloom et al., 2020). Rather than proposing predefined behavioral strategies, which constrain the range of possible job crafting actions, the NJCS emphasizes the extensive array of job crafting efforts available to employees. This offers opportunities to examine the motivations behind employees' choices of particular crafting efforts and why certain efforts may lead to varying outcomes. Such research questions could be addressed through, for example, qualitative and experiential research designs.

Third, as the boundaries between work and nonwork domains continue to blur, the interplay between employee crafting efforts in these two domains becomes increasingly intertwined. However, current crafting research lacks a comprehensive approach that fully captures employee crafting efforts within and across both life domains. Existing approaches typically assess crafting as context-specific behaviors (e.g., job, career, leisure, home) without a clear theoretical link between these behaviors. The NJCS combined with the NOCS (Kujanpää et al., 2022) thus offers researchers new opportunities to examine and understand crafting processes occurring within and across both life domains through the same theoretical lens of psychological needs (de Bloom et al., 2020). The joint application of both scales facilitates the examination of mechanisms such as spillover, compensation, or conflict in crafting efforts. This can advance our understanding of the interplay between crafting in the work and nonwork context, their interrelations, and how the two crafting processes contribute to employee well-being within and across both life domains.

Finally, the NJCS aligns well with and integrates existing theoretical developments in job crafting research. It acknowledges the distinction between approach and avoidance crafting orientation as proposed by Zhang and Parker (2019). In line with Wrzesniewski and Dutton (2001), it considers both behavioral and cognitive forms of crafting. Moreover, it indirectly captures the job demands and resources of the JD-R model (Bakker & Demerouti, 2017; Tims & Bakker, 2010) as a possible content of crafting. Job crafting for approach needs (AMMA) implies proactive accumulation of resources, while job crafting for avoidance needs (detachment, relaxation) implies proactively managing the demands. However, the spectrum of needs-based crafting extends beyond the predefined strategies outlined in JD-R based job crafting scales (e.g., Tims et al., 2012) as it covers any proactive effort that the individual considers relevant for fulfilling their psychological needs. This is also well-reflected by the incremental validity of the NJCS which explains a significant amount of additional variance in multiple work-related outcomes as shown in Study 3.

Practical Implications

The theoretical and empirical developments of the needs-based crafting approach are relevant for employees as well as for employers. With needs-based job crafting employees can take a bottom–up approach to proactively shape their work life based on their own psychological needs and goals. Our results suggest that job crafting for approach needs, especially meaning and affiliation, is beneficial for employee work engagement and job satisfaction. Employees can thus proactively foster their motivation and well-being at work. In addition, our study provides evidence that needs-based job crafting functions also as a preventive strategy for burnout and this is especially true for proactive strategies that promote meaning and detachment during off-job time. For employers, the results imply the potential benefits of offering opportunities and promoting initiatives that empower employees to seek fulfillment of their psychological needs and to develop strategies for psychological detachment and relaxation during their nonwork hours. Such proactive efforts can play an important role in employee motivation as well as in mitigating burnout concerns among employees. Finally, the underlying needs-based model of crafting and the DRAMMA dimensions can provide a comprehensible framing for future crafting interventions, guiding employees in reflecting and acting on their own needs satisfaction in their work/nonwork domains.

Strengths and Limitations

The main strength of our study lies in its design composed of three studies with three samples and a systematic approach to the validation of the scale. We used three culturally diverse samples to confirm the factor structure of the scale, and we showed that the scale is time invariant in two distinct longitudinal samples. Finally, we tested the validity of the scale using a large, heterogeneous cross-sectional sample to ensure that our conclusions about the validity of the scale are generalizable to a wide range of employees.

However, our study also has some limitations. The data used across the three studies are self-reported, which means that they are prone to biases such as social desirability, consistency motive, recall bias, or implicit theories (Podsakoff et al., 2003). This is particularly relevant for our outcome variables such as work engagement or burnout. To minimize the risk of such biases, we implemented various strategies in the questionnaire such as randomization of items and the use of disqualifying items (e.g., "please choose option number 2") to identify careless responding. Moreover, for Study 3 we contracted a professional panel data service that guarantees collection of high-quality data, and we performed a thorough data cleaning prior to the data analyses. Future studies are encouraged to use additional data sources such as peer ratings for outcome variables or daily diaries for crafting efforts to strengthen the empirical evidence. Another limitation is the use of convenience samples in Studies 1 and 2. Although this allowed us to examine the scale in culturally diverse environments, the samples were not balanced in sociodemographic characteristics. The Finnish sample was composed mostly of females working in health care, social services, and education, whereas the Japanese sample was predominantly composed of young male adults working in information technology. This limits the generalizability of the conclusions of Studies 1 and 2 in relation to other populations. However, the results in both distinct samples were consistent, and

we were also able to confirm the structure of the NJCS in Study 3, where we used a large sample that was balanced in terms of sociodemographic characteristics. We believe this provides sufficient empirical evidence for our conclusions about the factorial structure and validity of the scale, but we invite researchers to further test our scale on different populations using diverse approaches such as experience sampling and longitudinal designs.

Conclusion

Our study showed that the NJCS is a valid and reliable instrument that can be used to advance crafting research and practice within and beyond the work domain. We call for future studies with other populations using varied research designs to further scrutinize the scale and provide cumulative evidence about its psychometric properties and the antecedents and consequences of needs-based job crafting. For example, it would be interesting to examine the postulated link between needs-based job crafting and the JD-R model, particularly in relation to the motivational path and the gain spiral (Bakker & Demerouti, 2017). Furthermore, as the NJCS builds on the DRAMMA needs, it makes it possible to study (dis)satisfaction of needs as both predictors and outcomes of job crafting. Since the same model also underlies the NOCS, future studies would benefit from using both scales jointly. This would enable scrutiny of the mechanisms of spillover, compensation, and conflict across life domains and comparison of the effects of job and off-job crafting on diverse work- and nonwork-related outcomes. Finally, the underlying needs-based model of crafting and the DRAMMA dimensions could provide a comprehensible framing for future interventional (job) crafting studies.

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