



# Work limitations as a moderator of the relationship between job crafting and work performance: results from an SEM analysis of cross-sectional survey data

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## Abstract

**Purpose** Job crafting is an incremental, employee-initiated job design process used to achieve a better fit between job demands and worker skills. Persons with work limitations face multiple barriers to optimal work performance. Some persons with work limitations may innately use job crafting as a strategy to achieve better alignment with their job tasks and demands, however the extent to which job crafting may be helpful in improving work performance and engagement is unknown. The purpose of this study is (1) to examine the moderating role of work limitations in the relationship between job crafting and work performance and (2) to understand the complex relationship between job crafting, work limitations, work engagement, work performance, readiness to change, and worker characteristics.

**Methods** We conducted an online survey of workers with and without disabilities (final N = 742) in 2020–2021. Our sample included workers aged 18 and older. Descriptive statistics, bivariate statistics, and Partial Least Squares-Structural Equation Modeling (PLS-SEM) were used to assess the relationships among job crafting, work limitations, work engagement, work performance, readiness to change, and worker characteristics.

**Results** Work limitation moderates the relationship between job crafting and work performance by weakening the impact of innate job crafting on work performance. Worker characteristics such as education and years of work experience predict crafting behaviors and work engagement mediates the relationship between job crafting and work performance.

**Conclusions** Work limitation weakens the relationship between job crafting and work performance. Workers with limitations may benefit from job crafting interventions to increase work engagement and performance.

**Keywords** (up to 5 from [www.nlm.nih.gov/mesh/MBrowser.html](http://www.nlm.nih.gov/mesh/MBrowser.html)) Work engagement · Work performance · Workplace · Disabled persons · Job crafting · Work limitations

## Introduction

Working-age Americans with disabilities are substantially less likely to be employed than Americans without disabilities. In June 2021, 73% of working age persons without

disabilities and 32% of working age persons with disabilities were employed [1]. The large gap in employment rates between persons with and without disabilities has persisted over time, despite legislative action and substantial government and non-governmental investment in programs designed to support the employment of persons with disabilities [2, 3]. The population with disabilities is heterogeneous, of course, including persons with different types of health conditions or disabilities (e.g., intellectual and developmental disabilities, musculoskeletal disorders, psychiatric conditions, sensory conditions, spinal cord injuries). These conditions or disabilities can vary in severity and thus can have varying levels of effects on the ability to work. Indeed, among all working-age persons with disabilities in the U.S.,

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only a portion report disabilities that are severe enough to impact their ability to work [4].

While the United States offers social insurance and income assistance to persons who are unable to work due to a disability, these programs have been criticized as trapping participants in poverty given the inherent work disincentives that are tied to program eligibility [2]. Innovation is needed to improve employment rates among persons with work limitations to ensure that they can attain and sustain employment.

Job crafting, an employee-initiated behavior that can be used to modify job tasks, improve relationships with co-workers, reconsider the value of one's job, or improve workplace skills, is a potential innovation that might help improve employment rates for persons with disabilities [5]. Among the general population, job crafting has been shown to be positively related to work engagement, defined as a "positive, work-related state of mind in employees characterized by vigor, dedication, and absorption" [6]. Job crafting has also been shown to be closely tied to individual work performance, behaviors and actions that employees engage in, that are linked to an organization's goals [7, 8]. Workers with disabilities, however, are less likely than the general population to innately engage in job crafting than others [8] and the effect of job crafting on work engagement and work performance for persons with disabilities has yet to be explored.

To fill this research gap, this study uses newly available survey data, collected in 2020 and 2021 among American workers (N=742), and a Partial Least Squares-Structural Equation Modeling (PLS-SEM) approach to examine the relationships among worker characteristics, readiness to change, work limitations, job crafting, work engagement, and work performance.

## Job crafting

Job crafting is an informal, incremental, job re-design process that workers can use to refine and re-define the physical (how and where the task is performed), cognitive (meaning attached to the task or job), skill (seeking ways to learn skills), and relational (social interaction) aspects of their jobs [5, 9–12]. The general population of workers who use this process to self-manage their careers by negotiating and crafting job tasks to suit their unique needs, skills, and values, see improvements in job satisfaction, work engagement, work performance, and career success [7, 12–17].

Workers often use their own self-direction and initiative to change minor aspects of their jobs. Job crafting or the "actions employees take to shape, mold, and redefine their jobs" [5], p. 180) is a subset of proactive and protean

behaviors that workers undertake to shape how they perform their job tasks, who they interact with, and how they appraise the value of their job. Job crafting is a bottom-up, strengths-based approach to job re-design that has its roots in positive organizational psychology. Job crafting is a continuous on-the-job process that can provide benefits throughout different stages of one's career, as positions change or responsibilities grow. We discuss below three different types of crafting behaviors that employees use.

1. **Task crafting** refers to changes in job tasks and how they are performed. Task crafting can happen by employees taking on additional responsibilities, emphasizing certain job tasks or redesigning job tasks [18]. For people with disabilities, task crafting can include self-initiated changes in performing job tasks, such as using assistive technology or job redesign. Such task crafting among workers with disabilities is distinct from more 'top-down' approaches of workplace accommodation that are shepherded from an organizational level.
2. **Relational crafting** refers to changing the extent or nature of one's interactions with people within and outside the organization. Relational crafting can happen through building new relationships, reframing existing relationships, and adapting relationships. Relational crafting can also be embedded within task crafting, wherein social interactions are molded within the context of a particular task, thereby altering the way a task is performed.
3. **Cognitive crafting** involves changing perceptions about one's job or job tasks to enhance meaningfulness. This is a mental or cognitive type of job crafting since it does not involve making any physical or social changes but rather involves reshaping of one's thoughts and perceptions about one's job. Cognitive crafting can take the form of expanding perceptions, focusing perceptions, or linking perceptions where people make connections between different aspects of their job tasks to create a meaningful schema.

**Job crafting among workers with disabilities.** Job crafting has resonance as employers and human resource professionals are increasingly taking smaller roles in managing the careers of their employees. Instead, they are leaving it up to employees to shape and manage their own careers [19–21]. This means that employees, including those with work limitations, must become proficient in using methods to self-manage their careers. Evidence suggests that workers with disabilities are not able to shape and manage their careers on levels equal with workers without disabilities. In addition to experiencing lower employment rates overall, people with disabilities generally face lower career success and higher

rates of underemployment than those without disabilities [22–24]. Workers with disabilities are more likely to hold jobs with low levels of autonomy [25], which may limit their ability to engage in job crafting,

These disparities may arise from individual barriers to employment such as a person's health and functional capacity, work skills, and career interests [26–28]. Work limitations arise from the interaction of individual health and function with the organizational environment. Persons with cognitive, physical and/or psychological conditions may experience limitations in the amount or type of work they can do, depending on the severity or cyclical nature of their conditions and on the nature of their occupation, structural and social barriers such as trends in the labor market, employer characteristics, stigma, prejudice against disability, and the disincentive effects of public disability and unemployment benefits may also come into play [27, 29–33]. While workplace accommodations provided by employers, such as the provision of assistive technology or changes in work schedules, can mitigate some of these barriers, recent research suggests that only a quarter of older workers with disabilities in the U.S. receive accommodations [34].

Of course, some persons with disabilities do effectively manage and navigate workplace challenges and are able to sustain employment at the levels they prefer. Preliminary evidence suggests that people with disabilities who are successful in the workplace actively manage their careers by acquiring new skills, adapting to work roles, and self-advocate [1, 35, 36]. There has been limited evidence to date, however, about whether job crafting is a strategy routinely used by workers with disabilities to improve work engagement and work performance.

Brucker and Sundar [8] recently compared survey data collected from workers with disabilities to results found by Slemp & Vella-Brodick [37] among the general population and found that workers with disabilities (defined as persons reporting cognitive, hearing, mobility, vision, or other types of disabilities) engage in job crafting behaviors less than the general population. The authors suggest two reasons for these lower levels of job crafting among workers with disabilities. First, workers with disabilities are more likely to face limitations in social interactions in the workplace which impacts opportunities to engage in relational crafting. Second, persons with disabilities, in general, have lower levels of educational attainment than persons without disabilities and prior research has found a strong positive correlation between educational attainment and job crafting [8].

The research cited above suggests that job crafting has the potential to improve employment outcomes for employees who have work limitations. Workers can perhaps use this approach to improve the match between their resources,

which may be constrained, and their job demands. Employers must be open to such an approach, however, particularly among employees who do not have high levels of workplace autonomy.

Our study contributes to extant literature by extending this prior research and examining the structural relationships between job crafting, work engagement, and work performance for persons with and without work limitations. Our primary aim was to test whether work limitations can moderate the effect of job crafting on work performance.

## Work limitations as a moderator of job crafting and work performance

Borman and Motowidlo [38] characterized work performance as task and contextual performance. Task performance involves technical aspects of a job and is closely aligned with the job description. Contextual performance directly or indirectly relates to behaviors that align with the organization's goals and mission and supports the technical core of the job. Examples of contextual performance include volunteering, mentoring, helping, and other activities that go beyond the formal job description [39]. While task performance may vary depending on the nature of the job, contextual performance behaviors may be similar across jobs. Job crafting can have a positive impact on work performance. Workers who actively seek to increase their job resources, identify new ways of performing job tasks, and expand relational networks are more likely to meet their work performance expectations [40–42].

For workers with disabilities, job crafting may be a means to achieve self-preservation, where they are trying to minimize the impact of job stressors or stigmatizing presumptions of co-workers and supervisors. Job crafting may also offer workers with disabilities a protective mechanism against burnout, physical and emotional exhaustion [43]. A similar mechanism of action was suggested by Brzykcy and colleagues [44] using the Conservation of Resources (COR) framework. Workers with disabilities, when faced with a loss of personal resources, stressful work situations, or deteriorating health, strive to conserve their investments and resources (time and physical energy) when their investments do not yield adequate returns. Rather than investing more energy (through job crafting) in these situations, workers with disabilities may become more-risk averse. Repeated use of conservation and avoidance tactics may result in a downward spiral of expectations, motivation, and work performance [44]. On the other hand, workers who can successfully mobilize resources and actively use approach tactics (through job crafting) may be motivated by the novelty of new challenges, the availability of resources,

and ability to meet or exceed job expectations, resulting in a spiral of upward mobility through improved work performance. Our primary hypothesis for this study is thus that H1) Work limitations moderates (weakens) the relationship between job crafting and work performance. To fully understand the circumstances under which job crafting occurs requires that we also examine relationships among a number of related variables, as outlined below. Figure 1 shows the conceptual model that guides our hypotheses.

## Antecedents of job crafting

**Worker characteristics.** Persons with higher levels of educational attainment are more likely to engage in job crafting and persons with longer job tenure are less likely to engage in job crafting [15]. For our study, we thus hypothesize that H2) Higher levels of educational attainment are positively associated with job crafting, and H3) Longer work experience is negatively associated with job crafting.

**Readiness to change.** Within the industrial-organizational literature, readiness to change is a multidimensional construct that includes an emotional dimension, a cognitive dimension, and an intentional dimension, with each dimension reflecting employee beliefs in their potential and efficacy within broader organizational change [45, 46]. Matthysen and Harris [45] found a strong correlation between organizational readiness to change and employee work engagement. Lyons and colleagues [47] found a significant positive correlation between job crafting and readiness to change. Kriegel and Brandt [48] proposed that readiness is reflected in traits such as adaptability, resourcefulness, confidence, and passion or drive to perform. Such traits are indicative of individual readiness to change which can be described as a psychological state wherein workers acknowledge the potential to change, assess the potential change, and take a stance towards implementing specific actions [49]. Since job crafting involves actively redefining the boundaries of one's jobs by expanding roles or seeking resources, we hypothesize that H4) change readiness traits such as adaptability and resourcefulness are positively related to job crafting behaviors.

**Role of work engagement.** Engaged employees have high levels of energy and enthusiasm and are deeply committed to their work. Job crafting is not only positively associated with work engagement [15, 40, 50–52] but has also has a clear antecedent effect on improving work engagement [50, 53, 54]. In other words, workers who engage in job crafting may experience higher levels of work engagement since they are making proactive changes to their job tasks to better match their own strengths and needs [40, 41]. Work engagement can enhance both task and contextual

performance, in the sense that individuals who are dedicated to meeting their job expectations and enthusiastic about contributing to the organization are likely to perform better at work [39, 55, 56]. We posit that H5) Work engagement mediates the relationship between job crafting and work performance.

## Methods

### Data

We used quantitative data from an online survey conducted between October 2020 and May 2021. Participants were members of a voluntary panel maintained by Qualtrics, an online survey software company, and its partner organizations. Respondents were recruited by Qualtrics and its partner organizations using a variety of methods, including web intercept, targeted email lists, panel member referral, and social media. Incentives for respondents included cash payments, free downloads, and/or membership points; all incentives were decided and allocated by Qualtrics and its partners. Participants did not receive any direct compensation from the authors. Informed consent to participate was obtained in accordance with requirements of the University of New Hampshire (UNH) Institutional Review Board, and respondents were verified by Qualtrics through a double opt-in process. Respondents were included in the survey if they were adults between the ages of 18 and 64, working for at least 10 hours a week, and not participating in any Workers' Compensation program. We chose 10 hours a week as a minimum threshold of employment, understanding that workers with disabilities often work fewer hours than workers without disabilities [24]. We excluded persons who were participating in Workers' Compensation programs as these programs usually include formal medical or rehabilitation assistance to assist with employee return to work, which may limit the level of initiative an employee can use to job craft [57].

Electronic consent to participate, in accordance with protocols of the University of New Hampshire (UNH) Institutional Review Board, was granted by 929 individuals. Of those, 42 were excluded for not completing the survey. Another 145 responses were discarded for inattentive responding. Inattentive response pattern was defined as meeting one of the following three criteria; (1) respondents incorrectly answering at least two of the four reverse coded Likert-type items, (2) response time less than the median time to complete the survey (10 mins and 36 secs) or (3) incoherent or unintelligible responses to open ended questions to determine eligibility. The analytic sample for this study comprised the subset of the remaining 742 participants

who (a) were between the ages of 18 and 64, (b) were currently employed, and (c) responded to all the job crafting questions.

## Measures

**Persons with work limitations.** We used the Work Limitations Questionnaire (WLQ) [58] to identify our sub-populations of interest: working-age persons with and without work limitations. As opposed to more traditional survey measures of disability which gather self-reported information about the presence of any activity, functional and sensory limitations, the WLQ measures the extent to which individuals self-report that a health condition or chronic condition is limiting their ability to meet job demands in four areas: time management, physical demands, mental/interpersonal demands, and output demands. The WLQ thus identifies persons who have health or chronic conditions that are severe enough to impact work and can be considered as a sub-set of the general population with disabilities.

The 25-item WLQ includes four validated scales reflecting the dimensions above, all with Cronbach's  $\alpha \geq 0.90$  [58]. We used the shorter eight-item version of the WLQ which has been shown to demonstrate adequate reliability and validity [59]. The eight-item WLQ asks respondents the percentage of time, during the past 2 weeks, that they were able to meet specific work demands in the four dimensions mentioned above. Possible responses include "all of the time (100%)", "most of the time", "some of the time (about 50%)", "a slight bit of the time", "none of the time (0%)" and "does not apply to my job". The WLQ creates an index score where a score of zero means that an employee was limited none of the time and a score of 100 indicates that an employee was limited all the time.

## Antecedents of job crafting

**Worker characteristics.** We measured two key worker characteristics that have been found to be associated with job crafting: educational attainment and years of work experience. Educational attainment was measured categorically. We collapsed our educational attainment categories into two groups (less than a Bachelor's degree and more than a Bachelor's degree) to better align with past research that has identified this dichotomy as important for employment-related outcomes among persons with disabilities [60]. Years of work experience was captured categorically, ranging from 6 months to 20 years or more. We collapsed these categories into two groups: Less than 20 years of experience

and 20 years or more experience based on the median work experience reported by participants in our sample.

**Readiness to change.** We used the Change Ready Scale developed by Kriegel and Brandt [48]. It consists of seven sub-scales measuring resourcefulness, optimism, adaptability, confidence, adventurousness, tolerance for ambiguity, and passion/drive. To reduce respondent burden, we chose the resourcefulness and adaptability sub-scales from the Change Ready Scale since each sub-scale measures distinct dimensions of readiness to change and scores for sub-scales are interpreted independently.

## Job crafting behavior

To measure job crafting behavior, we used the Job Crafting Questionnaire (JCQ) developed by [37]. The JCQ examines job crafting behaviors in three domains: task, relational and cognitive. The scale includes 15 items scored on a 6-point Likert scale and has been widely tested for reliability and validity. Slemp et al. [37] noted a Cronbach's  $\alpha$  of 0.95.

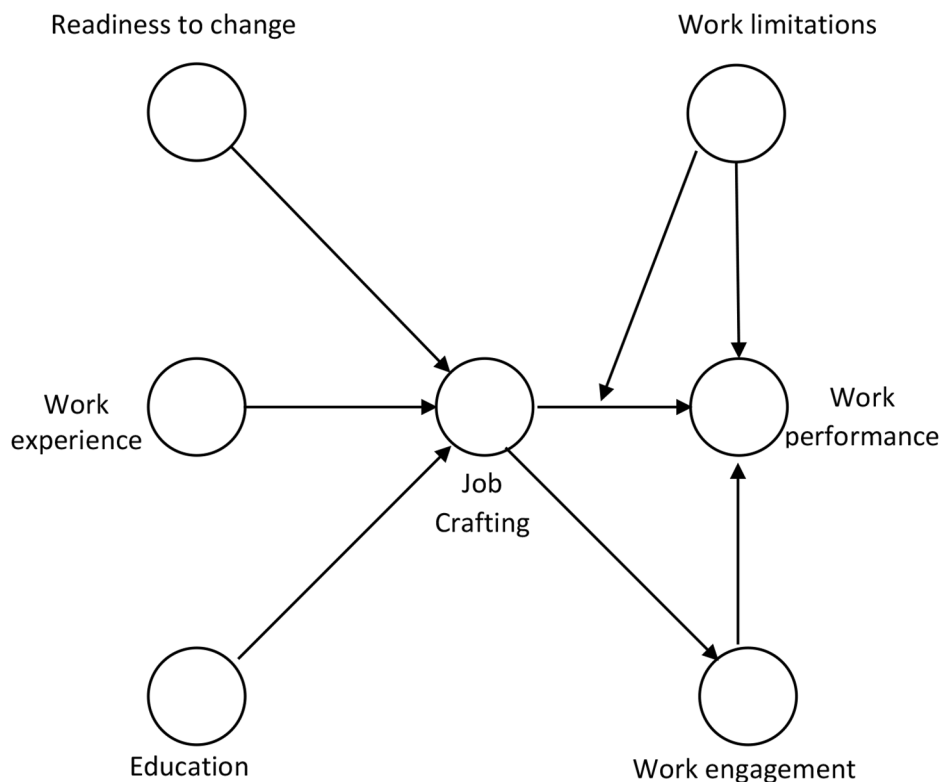
## Focal outcome variable: Individual work performance

We used the Individual Work Performance Scale [61], a generic measure of self-reported individual work performance that addresses "behaviors and actions that are relevant to the goals of the organization" [62] rather than the results of these actions. The Individual Work Performance questionnaire includes three subscales: task performance, contextual performance and counterproductive work behavior. We used the task and contextual performance subscales since counterproductive behavior was not the focus of our study. All items have a recall period of 3 months. Task and contextual performance were rated on a 5-point scale (0=seldom to 4=always). A mean score for each scale is calculated by adding the item scores and dividing their sum by the number of items in the scale. Reliability and validity were established using Rasch analysis [61, 63, 64]. Koopmans et al. [61] recommend using subscale scores rather than total scores since the constructs measured are distinct from each other.

### Secondary outcome variable: Work engagement.

We used the Utrecht Work Engagement Scale (UWES) [6] which measures engagement in three domains (vigor, dedication, and absorption) scored on a 6-point Likert scale. The scale has been widely researched and translated into 13 other languages. Reliability coefficients range from 0.85 to 0.94 and validity coefficients range from 0.70 to 0.93 [65].

### Analytical approach.



**Fig. 1** Conceptual model

Exploratory and descriptive data analysis was conducted using IBM SPSS version 25. We used descriptive statistics to understand the sample profile and check for normal distribution of scores for latent variables and exploratory chi-square analyses to examine the differences between workers with and without disabilities. Next, we used Partial Least Squares-Structural Equation Modeling (PLS-SEM) to explore relationships among the latent constructs. The general purpose of SEM is to derive unbiased estimates of the relationship between latent (unobservable) constructs, which are composites of indicators (items). Reinartz, et al., [66] recommend using PLS-SEM rather than covariance-based SEM when the purpose of the research is the prediction of latent variables and identification of relationships between latent variables rather than theory development or refinement and when dealing with a complex structural model. Unlike traditional covariance-based SEMs, the goal of PLS-SEM is to maximize the variance explained between the latent constructs and it is preferred for exploratory analyses [67]. For these reasons, and because very little research exists exploring the relationship between job crafting, work limitations, and work engagement, we choose to use PLS-SEM rather than traditional covariance-based SEM.

The structural model is presented in Fig. 1. The structural model includes three endogenous variables: (1) work

limitations, (2) readiness to change, and (3) worker characteristics. Worker characteristics included two variables: educational attainment and work experience.

Exogenous variables in the model were (1) job crafting, (2) work engagement, and (3) individual work performance. Data was analyzed using a two-stage model [67, 68]; first, the outer model examined the makeup of the latent variables and second, the inner or structural model, examined the relationship between the latent constructs. The first stage (measurement model) is similar to exploratory factor analysis where the loading or weights of each item (indicator) on the latent factor is examined. In the first stage, outer models can be specified as reflective or formative. Reflective models are used when the latent construct causes the indicators (items). In other words, observed indicators (items) reflect the underlying, unobservable latent construct. For example, customer satisfaction measured by a set of Likert scale items can be considered reflective because the items reflect the latent construct of satisfaction. Formative models are used for latent variables that are caused by the indicators (items). Socio-economic status measured as a composite of income, education, and assets can be considered as a formative construct because the indicators (items) constitute the latent construct. Indicators (items) of reflective constructs are expected to correlate highly with each other and can

**Table 1** Demographics

	N = 742
Age	19 (2.6%)
18–24	83 (11.2%)
25–34	192 (25.9%)
35–44	203 (27.4%)
45–54	245 (33.0%)
55–64	
Gender	352 (47.4%)
Male	390 (52.6%)
Female	
Education	309 (41.6%)
Associate's degree or lower	433 (58.4%)
Bachelor's degree or higher	
Race	586 (79.0%)
White (Caucasian)	27 (3.6%)
Black (African American)	97 (13.1%)
Asian	4 (0.5%)
American Indian or Alaska Native	5 (0.7%)
Native Hawaiian/Other Pacific Islander	17 (2.3%)
Other	6 (0.8%)
Unknown	
Ethnicity	27 (3.6%)
Hispanic or Latino	715 (96.4%)
Not Hispanic or Latino	
Hours of work per week	62 (8.4%)
15–20 h	521 (70.2%)
21–40 h	159 (21.4%)
Over 40 h	
Work experience	284 (38.3%)
Less than 20 years	458 (61.7%)
20 years and above	

be substituted by other indicators (items) measuring the same construct. Indicators of formative constructs are not expected to correlate with each other and may not be easily replaced by other indicators.

For this study, we conceptualized readiness to change and work engagement as reflective constructs since these constructs are made up of items that are highly correlated and interchangeable. Worker characteristics, work limitations, job crafting, and individual work performance were conceptualized as formative constructs because we believe that these constructs are best represented as composites of indicator items and there is little observed correlation between the indicators that make up the construct. For reflective constructs, outer loading, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) were considered. Items that did not meet the recommended threshold levels (described in Results section) were deleted from further analyses. For formative constructs, outer weights and multicollinearity (variance inflation factor, or VIF) were examined. The significance of outer weights were established by analyzing the bias-corrected confidence intervals.

Discriminant validity for both formative and reflective constructs were examined using the Fornell-Larcker

**Table 2** Measurement Model – Outer weights of Formative constructs

Construct & Subscales		Outer weight	VIF
Work Limitations	Formative	0.010	1.263
Physical		0.462	2.384
Mental		0.383	2.231
Output		0.281	1.745
Time management			
Job Crafting	Formative	0.517	2.019
Task Crafting		0.009	1.987
Relational Crafting		0.584	1.902
Cognitive Crafting			
Individual Work Performance	Formative	0.705	1.496
Contextual Performance		0.411	1.496
Task Performance			

criterion and heterotrait-monotrait (HTMT). The Fornell-Larcker criterion requires that for any latent variable, the variance shared with its block of indicators should be greater than the variance shared with other latent variables in the model [69]. HTMT is a more stringent criterion to assess discriminant validity, or the lack thereof [70].

The inner structural model was examined through the direct and indirect effect pathways between the latent constructs. Strength of direct and indirect effects were examined through the path coefficients and significance of path coefficients were established using bias corrected confidence intervals (with alpha set at 0.05).

## Results

Our study sample included 270 workers with a work limitation and 472 workers without a work limitation. About 47.4% of the sample were male, 41.6% had a bachelor's degree or higher, 79% were White Caucasian, and about 62% had over 20 years of work experience. Participant demographics are presented in Table 1.

## Assessment of the measurement model

The first stage of PLS-SEM tested the outer measurement model by examining the reliability and validity of formative and reflective constructs. Testing the outer measurement model establishes the measurement integrity of the latent constructs in the model and should be conducted prior to testing the structural (inner) model. Overall, the outer weights for formative constructs seemed adequate (Table 2). In addition, we examined Variance Inflation Factor (VIF) which is used to determine multicollinearity among predictor variables. VIFs of all indicators were below the recommended threshold of 5.0 [67] suggesting no concern of multicollinearity among predictor variables.

**Table 3** Measurement model—Reliability and validity of reflective constructs

Constructs & Items	Type of construct	Outer loading (p-value)	Composite reliability	Cronbach’s alpha	Average Variance Extracted (AVE)				
Readiness to Change	Reflective	0.734	0.904	0.867	0.653				
If something’s broken, I try to find a way to fix it		0.789							
When I get stuck, I’m inclined to improvise solutions		0.790							
When people need solutions to problems, they call on me		0.884							
My strength is to find ways around obstacles		0.837							
I look in unusual places to find solutions									
Work Engagement		Reflective				0.776	0.941	0.928	0.667
At my work, I feel like I am bursting with energy						0.823			
At my job, I feel strong and vigorous						0.878			
I am enthusiastic about my job						0.847			
My job inspires me	0.836								
When I get up in the morning, I feel like going to work	0.815								
I feel happy when I am working intensely	0.767								
I am proud of the work that I do	0.785								
I am immersed in my work									

Next, we examined outer loading, internal consistency, and convergent validity of the reflective constructs in the

outer model (Table 3). Outer loading represents the absolute contribution of the indicator to the definition of its latent variable. Indicators with an outer loading less than 0.7 were not included in the final model due to their poor contribution to the overall construct. Composite reliability and internal consistency for the final model were found to be above the recommended value of 0.7 [67]. Internal consistency (Cronbach’s alpha) ranged between 0.867 and 0.928 and composite reliability was between 0.904 and 0.941. Average variance extracted (AVE) was used to identify the convergent validity or correlations between indicators of the same construct. AVE ranged between 0.653 and 0.667 and was above the 0.5 cutoff value for all constructs [69, 71]. Results for reliability of reflective and formative constructs are presented in Tables 2 and 3.

Next, we evaluated discriminant validity by examining the Fornell-Larcker criterion and heterotrait-monotrait (HTMT). Discriminant validity is the extent to which the latent constructs are distinct from each other. Results from validity testing are presented in Tables 4 and 5. As seen in Table 4, the cross loadings between the constructs are lower than the factor loadings on the indicators. HTMT for all constructs (Table 5) were between 0.023 and 0.501, well below the recommended threshold of 1.0. HTMT values over 1.0 indicate a lack of discriminant validity [72].

**Assessment of structural model**

The relationship between the latent constructs was examined through analysis of the structural model<sup>1</sup>. All latent constructs hypothesized contributed to the structural model and were retained in the final model (Fig. 2). Approximately 28% of the variance in individual work performance, 30% of the variance in work engagement and 17% of variance in job crafting were explained by latent constructs in the structural model (e.g., individual and work characteristics, readiness to change, work limitations, etc.) (Table 6).

Table 7 shows the direct path coefficients as well as the moderation effect of work limitations and the mediating effect of work engagement. Our primary hypothesis (H1: Work limitations moderates (weakens) the relationship between job crafting and individual work performance) is accepted, as we find a significant coefficient (-0.089,  $p=0.001$ ) for the moderating effect of work limitations. This negative coefficient suggests that the impact of innate job crafting on individual work performance is less pronounced when work limitations are present. The effect size

<sup>1</sup> Our initial structural model included demographic characteristics such as age, race, and gender. These variables were dropped from the final model because of multicollinearity or because they did not contribute to the overall mode.



**Table 4** Discriminant validity: Fornell-Larcker Criterion

	Education	Job Crafting	Job Crafting X Work Limitations	Readiness to Change	Work Engagement	Work Experience	Work Limitations
Education	1.000						
Job Crafting	0.092	1.000					
Job Crafting X Work Limitations	-0.032	0.040	1.000				
Readiness to Change	0.038	0.388	-0.025	1.000			
Work Engagement	0.093	0.543	0.006	0.450	1.000		
Work Experience	-0.125	-0.068	-0.022	0.121	0.172	1.000	
Work Limitations	-0.023	-0.113	-0.151	-0.214	-0.414	-0.212	1.000
Individual Work Performance	-0.027	0.286	-0.065	0.391	0.501	0.188	-0.337

**Table 5** Outer model HTMT

	Education	Readiness to Change	Work Engagement	Work Experience
Education				
Job Crafting X Work Limitations	0.032			
Readiness to Change	0.051	0.033		
Work Engagement	0.105	0.030	0.499	
Work Experience	0.125	0.022	0.130	0.179

**Table 6** R square

	R Square	R Square Adjusted
Job crafting	0.168	0.165
Work Engagement	0.294	0.293
Individual Work Performance	0.281	0.277

for the moderating variable ( $f^2$ ) was 0.012, which can be interpreted as a medium effect size [73, 74]<sup>2</sup>.

Our next two hypotheses (H2 & H3) examine the direct effect of worker characteristics (educational attainment and work experience) on job crafting. A significant positive path coefficient was observed between educational attainment and job crafting (0.064,  $p=0.032$ ), suggesting that persons

<sup>2</sup> This interpretation of moderation (interaction) effects is different from conventional effect sizes such as Cohen’s d. Aguinis and colleagues [74] have established that the average effect size for moderation (interaction) effects is 0.009. Moderation (interaction) effect sizes of 0.005, 0.01, and 0.025 are considered small, medium, and large respectively.

**Table 7** Path coefficients

Hypothesis	Relationship	Path Coefficient	T-value	95% Bias Corrected CI	p-value	Hypothesis Supported
1.	Job Crafting X Work limitations	-0.084	3.348	-0.139-0.046	0.001	Yes
2	Edu. → Job Crafting	0.064	1.831	0.006–0.120	0.034	Yes
3	Work Experience → Job Crafting	-0.109	3.184	0.052–0.164	0.001	Yes
4	Readiness to Change → Job Crafting	0.403	12.191	0.341–0.448	0.000	Yes
5	Job Crafting → Work Engagement (5a)	0.545	16.84	-0.482–0.590	0.000	Yes
	Work Engagement → Work Performance(5b)	0.403	8.465	0.329–0.479	0.000	Yes
	Job Crafting → Individual Work Performance (5c)	0.042	0.908	-0.032-0.118	0.182	No

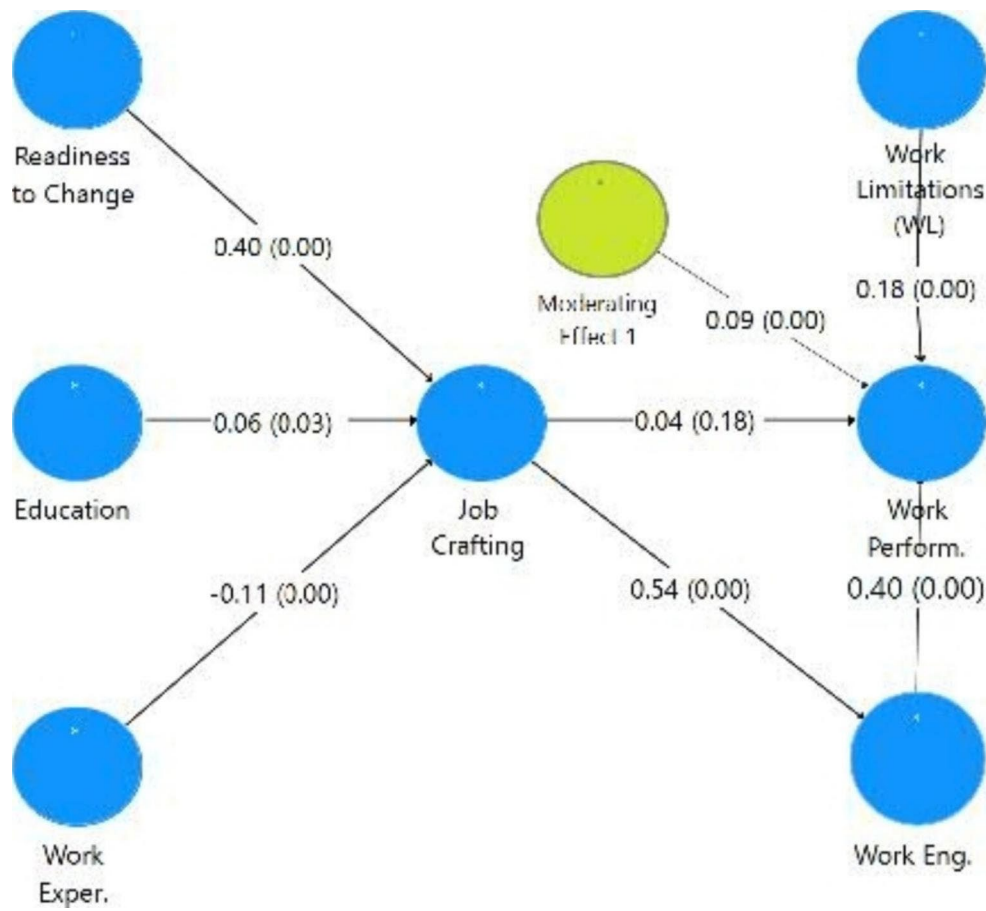
with higher levels of education crafted more often. A significant negative path coefficient was observed between work experience and job crafting (-0.109,  $p=0.001$ ), suggesting that persons with more years of work experience exhibited fewer job crafting behaviors.

Our fourth hypothesis (H4) examines the direct effect of readiness to change on job crafting. Recall that we measured two traits of readiness to change, adaptability and resourcefulness. A moderate positive path effect was observed between readiness to change and job crafting (0.399,  $p<0.000$ ). This suggests that persons who are more adaptable and resourceful are more likely to engage in job crafting behaviors.

Our final hypothesis (H5) tests the mediating effect of work engagement between job crafting and individual work performance. Job crafting had a moderate positive effect on work engagement (0.543,  $p<0.000$ ). Work engagement in turn has a moderate significant impact on individual work performance (0.405,  $p<0.000$ ). Whereas the direct effect of job crafting on individual work performance is small and non-significant (0.042,  $p<0.0.176$ ). Work engagement has an indirect-only mediating effect on individual work performance [75], meaning it enhances the relationship between job crafting and individual work performance.

## Discussion

This study is the first, to our knowledge, to examine the complex relationships among work limitations, worker



**Fig. 2** Structural model

characteristics, readiness to change, job crafting, work engagement, and individual work performance<sup>3</sup>. Our most important finding is that work limitations can moderate the effect of job crafting on individual work performance. Recall that the ‘work limitations’ measure used in this study essentially hinged on the extent to which a medical condition impacted different facets of work (e.g., physical activities, time management) which means that our measure of work limitations identifies only the sub-set of persons who have disabilities who have conditions which impact their work. One would expect that work performance would be lower for persons who reported work limitations. We find that the reduction in individual work performance may correspond to having a work limitation, which weakens the effect of innate job crafting on work performance.

The modest, non-significant effect of job crafting on individual work performance may be because individuals with work limitations approach and use job crafting differently compared to their peers. Workers with limitations may need to prioritize undertaking prevention-oriented crafting

strategies just to maintain employment. This may leave little bandwidth for persons with work limitations to also undertake promotional forms of crafting which are important if employees wish to meet or exceed their current job role demands. Nevertheless, the negative moderating effect of work limitations on individual work performance suggests that workers with limitations may have fewer opportunities to benefit from the effect of job crafting on work performance. Since job crafting can be used by persons with and without work limitations alike, it can be an identity-blind accommodation approach in the workplace [76]. Rather than focusing on the impairments and limitations, job crafting can be an informal, equalizing strategy that workers with or without work limitations can implement to achieve optimal work performance.

Intervention studies that examine the impact of job crafting on work performance and work engagement have shown larger effect sizes [40, 41, 77]. The moderate effect of job crafting on individual work performance observed in our study may be a reflection of innate job crafting that our participants engaged in. Participants in job crafting intervention studies typically receive coaching, facilitation, or training in how to implement job crafting paired with goal

<sup>3</sup> Our hypotheses explored the direct effects on individual work performance and work engagement. Examination of specific indirect effects was beyond the scope of this paper.

setting and monitoring [40, 41]. In comparison, participants in our study reported on their innate job crafting behaviors without any external coaching or facilitation of crafting behaviors. However, previous research [8] has established that workers without any work limitations engage in job crafting at higher levels than workers with work limitations. Taken together, we believe that our current findings lay the foundation for future research on the impact of job crafting interventions to minimize the impact of work limitations on work performance. It is possible that our model underestimates the role of job crafting in comparison with intervention studies.

However, since we did not collect information about whether our sample had ever participated in a job crafting training or intervention, we cannot say for certain whether these respondents were engaging in job crafting naturally or because of training they had received at some point in their careers. Employee interventions exist that can teach and solidify job crafting behaviors and skills. To date, however, these interventions have only been tested among the general population, so their effectiveness with persons with work limitations is unclear. Interventions which promote job crafting among workers with disabilities might have value in helping these workers sustain their levels of individual work performance and, ultimately, their careers. Future research should develop and test such interventions specifically for the population with disabilities. Consideration should be given to using alternate measures of work performance as well, perhaps those based on external perceptions of a workers' performance (e.g., supervisors, co-workers, etc.).

Our results highlighted a number of other important findings as well. First, we find that certain worker characteristics are associated with job crafting. Persons with more years of overall work experience engage in lower levels of job crafting. This is consistent with the findings of Rudolph [15] who found that older workers were less likely to engage in job crafting. It is possible that older workers are set in their ways and have an established routine for task and job performance. We found that individuals with higher levels of education were more likely to craft in their jobs. Individuals with higher levels of education may be employed in positions that offer greater autonomy and therefore have better opportunities to craft their jobs. Future research should further explore whether these patterns hold true for workers with and without limitations. Furthermore, as these individual characteristics might also be associated with people selecting into different types of employment (e.g., employment in different industries and occupations) and different work arrangements (e.g., part-time v. full-time), future research should consider these factors.

Our results further show that adaptability and resourcefulness, two components of readiness to change, are key antecedents of job crafting. As mentioned earlier, teaching individuals how to engage in behavior change could help workers be more prepared to initiate job crafting related changes. Motivational interviewing is one technique that has been proven to help workers with limitations address behavior change to facilitate employment engagement [78].

In turn, our findings confirm that job crafting predicts work engagement, and that work engagement mediates the relationship between job crafting and work performance [79, 80]. Crafting behaviors have shown to be strong predictor of work engagement, especially task and cognitive crafting. Workers who are able to reframe current and past experiences, seek resources and opportunities to achieve better fit with job demands, or better align job tasks with their interests are likely to be more engaged with their jobs. Future research can further explore sub-group differences in this relationship.

Our findings suggest that among the three types of crafting, task and cognitive crafting contributed heavily to the construct of job crafting. It should be noted that this study was conducted during the COVID-19 pandemic, when many workers were working remotely or under social distancing conditions with few opportunities for social interactions. Opportunities to engage in relational crafting may therefore have been reduced. Also, many workers had to substantially modify how they performed or approached their job tasks under conditions of the pandemic. It is possible that our findings reflect COVID-19 related-changes in the work environment. Future research to confirm these findings is warranted.

## Limitations

Our study did not collect detailed information about jobs. Others have identified job characteristics as important factors in determining the extent in which employees might craft their jobs. Persons working in jobs with high autonomy, for example, may have increased opportunities to engage in job crafting. In addition, we did not gather information about receipt of workplace accommodations which might have been helpful in better understanding the nature of work among our study participants as well as the level of organizational support provided by employers. Lastly, our study used a cross-sectional design to examine the relationship between job crafting and work limitations, rather than a longitudinal design.

## Conclusions

Using newly available data on American workers, our study is the first to suggest that work limitation moderates the impact of job crafting on job performance. These findings point to a need to further develop and test job crafting interventions especially for with persons with work limitations, as such interventions can be relatively low cost and may prove effective in addressing the persistent gap in employment between persons with and without disabilities mentioned at the outset of this article.

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**Data Availability(data transparency)** Data is not publicly available.

**Code Availability(software application or custom code)** Not applicable.

## Declarations

**Conflicts of interest/Competing interests** The authors declare that they have no conflicts of interest.

**Ethics approval** The study was approved by the University of New Hampshire-Institutional Review Board (#7037).

**Consent to participate** All participants signed an electronic informed consent form approved by the University of New Hampshire-Institutional Review Board.

**Consent for publication** Not applicable.

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