

The Role of Job Crafting and Psychological Capital in the Relationship between Job Autonomy and Work Engagement: A Serial Mediation Model

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Abstract. Work engagement is a scientifically consolidated variable, due to its fundamental role in business practice. To increase work engagement in companies, it is necessary to know which variables are antecedents and how they relate to each other. These variables include job autonomy, job crafting, and psychological capital. This research evaluates the relationships between job autonomy, job crafting, psychological capital, and work engagement. Specifically, based on the job demands and resources model and the conservation of resources theory, the study examines these relationships in a sample of 483 employees, through a serial mediation model. The results show that job crafting, and psychological capital mediates the relationship between job autonomy and work engagement. These results have practical implications for interventions to promote employee work engagement.

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The 21st-century world of work is characterized by high levels of uncertainty and flexibility, with a rapidly changing labor market (Kim & Beehr, 2021). In this context, companies are increasingly dependent on their people and need to care about their well-being (Robijn et al., 2020; Schaufeli, 2017). For their part, workers have to cope with high demands, which impel them to work harder and put more energy into their tasks (Shimazu et al., 2020). To be more committed to their work and to

experience high levels of work engagement (Xi et al., 2020), they need high levels of task concentration and dedication (Beal et al., 2005). Evidence shows that workers with high work engagement feel more energetic, show higher enthusiasm for their work, and are fully involved in their work activities; thus, they respond to work demands more effectively and optimally (Bakker, 2022; Bakker & Albrecht, 2018; Schaufeli & Salanova, 2011).

Previous research has shown that in addition to organizational factors, such as job autonomy (Taipale et al., 2011), personal factors are crucial in fostering positive states at work (e.g., Shin et al., 2018; Vogt et al., 2016). Specifically, job crafting behaviors can facilitate the development of psychological capital (Kerksieck et al., 2019; Uen et al., 2021) and predict it over time (Vogt et al., 2016), which in turn can promote decent work and more job satisfaction for employees (Svicher & Di Fabio, 2021), as well as increase their work engagement. From the perspective of people management, it is crucial to identify organizational practices that can promote work engagement (Bakker & Albrecht, 2018). Thus, Albrecht et al. (2015) suggest the need to

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integrate work engagement into human resource management policies and practices. It is necessary to know which variables, personal and organizational, are antecedents of work engagement, which variables are mediators, and how their combination can promote the achievement of higher levels in the workforce.

Work engagement is a positive and satisfying work-related state of mind (Schaufeli & Bakker, 2004) and consists of three dimensions: Vigor, dedication, and absorption (Schaufeli et al., 2002). According to previous research, some of the most relevant work engagement antecedents are job autonomy, considered as a job resource (Halbesleben, 2010), job crafting, considered as a set of individual strategies for designing and redesigning one's work (Bakker, Rodríguez-Muñoz, et al., 2012; Demerouti, 2014; Tims et al., 2015), and psychological capital, considered as a personal resource (Arasli et al., 2019).

Current research finds a relationship between job crafting, psychological capital, and work engagement (Shin et al., 2018; Vogt et al., 2016). However, no previous research has been found that includes job autonomy in this relationship; this is, even more, the case when job autonomy is an antecedent to work engagement (Taipale et al., 2011). As job demands-resources theory postulates, work engagement experiences cannot depend exclusively on personal resources, but should also be considered as work resources provided by the organization (Bakker & Demerouti, 2007; Demerouti et al., 2001; Schaufeli, 2017). Consequently, this research aims to identify the relationships between job autonomy, job crafting, psychological capital, and work engagement. The main contribution of this study lies in extending the analysis of the antecedents of work engagement by exploring the joint role of job autonomy (i.e., an organizational resource), job crafting, and psychological capital (i.e., personal resources).

Theoretical Background and Hypothesis

Relationships between Job Autonomy, Job Crafting, and Psychological Capital

Autonomy is a work resource that provides the employee with decision latitude and independence in planning work and determining the procedure to be used to carry it out (Hackman & Oldham, 1975). Job autonomy can lead to a psychological state of experienced responsibility, which in turn can lead to favorable work attitudes and behaviors (Deci et al., 2017). High job autonomy at work implies a high level of discretion in making decisions, such as the methods of task execution, the choice of procedures to follow, and the scheduling of work (Ng et al., 2008). In short, when the organization

provides workers with job autonomy, it is allowing them to make decisions about: (a) How they do it (method autonomy); (b) when they do it (working time autonomy); and (c) how they make decisions (decision-making autonomy) (Kubicek et al., 2017).

Job crafting is a specific form of proactive work behavior that involves employees actively modifying the perceived characteristics of their jobs (Tims & Bakker, 2010; Wrzesniewski & Dutton, 2001). It constitutes the changes that workers make to balance their resources and job demands with their personal capabilities and needs (Tims et al., 2012). Job crafting is a proactive employee-initiated work behavior that involves job redesign (Demerouti & Bakker, 2014; Parker, 2014). It consists of four dimensions: a) Increasing challenging job demands; (b) decreasing hindering job demands; (c) increasing structural job resources; and (d) increasing social job resources (Tims & Bakker, 2010; Tims et al., 2012). Previous research shows relationships between job autonomy and job crafting, which seems to indicate that job autonomy is one of the main antecedents of job crafting (Leana et al., 2009; Slemp et al., 2015). A high degree of job autonomy stimulates job crafting, by signaling to employees that they have the freedom and opportunity to take the initiative (Petrou et al., 2012).

Psychological capital is a positive psychological state, a second-order construct that comprises four dimensions: (a) Self-efficacy; (b) optimism; (c) hope; and (d) resilience (Luthans & Youssef-Morgan, 2017). Consistent with conservation of resources (COR) theory (Hobfoll, 2011), psychological capital is consistent with the notion of 'resource caravans' –in other words, psychological resources that can travel together and interact synergistically to produce differentiated manifestations over time and across contexts (Luthans & Youssef-Morgan, 2017). There is evidence of relationships between job autonomy and psychological capital (e.g., Peral & Geldenhuys, 2016; Shahzad, 2021). Employees who perceive high levels of job autonomy (considered as a job resource) tend to exhibit higher psychological capital, a personal resource (Hobfoll, 2011).

Previous research shows the existence of a relationship between job crafting and psychological capital (e.g., Cenciotti et al., 2017; Sesen & Ertan, 2020; Uen et al., 2021). The implementation of the work tasks on which job crafting is based depends to a large extent on the personal resources that constitute psychological capital (Christian et al., 2011; Rich et al., 2017). In this sense, based on job crafting and the dimensions of psychological capital, employees are more likely to craft their jobs and tasks when they are optimistic (Luthans, Avolio, et al., 2007). In addition, employees are more

flexible to challenging demands when they have high levels of resilience (Minseo & Beehr, 2021). On the other hand, internal locus of control and the need for achievement, both of which are necessary for job crafting, are associated with employees who show high levels of hope (Luthans, Youssef, et al., 2007). In this regard, some interventions in business settings to enhance job crafting increase employee self-efficacy (van den Heuvel et al., 2015).

From all the above, it can be seen the existence of scientific evidence on the direct relationships between job autonomy and job crafting, job autonomy and psychological capital, and job crafting and psychological capital. However, no previous research has been found that relates job autonomy, job crafting, and psychological capital together.

Relationships between Job Autonomy, Job Crafting, Psychological Capital, and Work Engagement

Job autonomy is an important work resource that fosters work engagement (Schaufeli & Salanova, 2007a). It has been identified as a significant antecedent of work engagement (Bakker et al., 2014), and there is strong evidence of the relationship between the two constructs (Bakker & Demerouti, 2007; de Lange et al., 2008; Hakonen & Roodt, 2010; Schaufeli & Salanova, 2007a). In this sense, the job demands and resources model (JD-R) (Bakker & Demerouti, 2007; Demerouti et al., 2001) postulates that job autonomy, as a job resource, initiates a motivational process in employees that results in a higher level of work engagement. Therefore, when challenging job demands are combined with valuable job resources such as job autonomy, work engagement levels increase (Bakker & Demerouti, 2017). Based on these rationales and the empirical evidence also mentioned in the previous section, we formulate the following hypothesis:

H₁: There will be a positive relationship between job autonomy and employee work engagement.

On the other hand, there is evidence that job crafting also acts as a significant antecedent of work engagement (Bakker, Tims, et al., 2012; Bakker et al., 2016; Mäkikangas, 2018; Vogt et al., 2016). Employees who work in a position where they can design their work procedures and strategies are more likely to experience high levels of work engagement (Bakker, Rodríguez-Muñoz, et al., 2012; Halbesleben, 2010; Vogt et al., 2016). The proactive behavior involved in job crafting makes them more likely to experience a positive mood, characterized by vigor, dedication, and absorption (Schaufeli et al., 2002). As can be seen from the results obtained in these studies, the relationship between job

crafting and work engagement is well established in previous research, both in cross-sectional and longitudinal studies, and using samples from diverse work contexts (Letona-Ibañez et al., 2021). Based on this evidence, we propose the following hypothesis:

H₂: There will be a positive relationship between job crafting and employee work engagement.

Previous evidence shows that psychological capital has a direct association with work engagement (Bakker & Demerouti, 2014; Luthans et al., 2006; Xi et al., 2020). Employees with personal resources such as self-efficacy, hope, optimism, and resilience are characterized by high work engagement scores (Adil & Kamal, 2016; Luthans et al., 2008). Personal resources help employees feel involved in their work (Arasli et al., 2019), which contributes to them coping with prevailing work demands and achieving work goals. When employees have a more positive view of themselves through personal resources, they feel better able to meet work demands and achieve their goals, despite adversity (Bakker & van Wingerden, 2021). For example, the longitudinal study by Alessandri et al. (2018) found that both absolute levels and growth over time in psychological capital predicted subsequent work engagement growth, demonstrating the dynamic relationship between these variables. Based on these rationales and previous empirical evidence, we formulate the following hypothesis:

H₃: There will be a positive relationship between psychological capital and employee work engagement.

In short, the accumulated empirical evidence strongly supports direct relationships between job autonomy (work resource), job crafting, psychological capital (personal resources), and work engagement. If job autonomy is an antecedent of job crafting behaviors, and if job crafting is related to psychological capital, as recent research shows (e.g., Kerksieck et al., 2019; Svicher & Di Fabio, 2021; Uen et al., 2021), it seems necessary to investigate whether these two personal resources can play a mediating role between job autonomy and work engagement.

The Mediating Role of Job Crafting and Psychological Capital

There is scientific evidence that identifies job crafting as a mediator between work engagement and job performance (Robledo et al., 2019); it is also the mediator in the relationship between psychological capital and job satisfaction (Cenciotti et al., 2017). However, no studies have been found that analyze the mediation of job crafting in the relationship between job autonomy and

work engagement. In terms of psychological capital, some studies introduce this construct as a mediator but only considered the relationship between job crafting and work engagement (Arasli et al., 2019; Uen et al., 2021). Some research provides early indications that psychological capital mediates the relationship between job autonomy and work engagement (Ahsan et al., 2019; Muneeb & Maochun, 2019) but the evidence is not yet strong. The established research relationship between job crafting and psychological capital (e.g., Cenciotti et al., 2017; Sesen & Ertan, 2020; Uen et al., 2021) suggests that both constructs may mediate the relationship between job autonomy and work engagement (Bakker & Demerouti, 2007; Hakanen & Roodt, 2010; Schaufeli & Salanova, 2007b). But as already mentioned, there are no studies that jointly include job crafting and psychological capital as mediators in the relationship between job autonomy and work engagement. Thus, the assumption is that psychological capital and job crafting mediate the relationship between job autonomy and work engagement. The JD-R model is used as a basis to justify that both job and personal resources are proposed as important predictors of work engagement outcomes (Halbesleben, 2010). The JD-R model assumes a motivational process in which job resources, such as job autonomy, influence work engagement and are its antecedent (Airila et al., 2014; Bakker, Tims, et al., 2012; Schaufeli et al., 2008; Xanthopoulou et al., 2009b). In addition to the JD-R model, the model we propose is based on the COR theory (Hobfoll, 2011), which postulates that work resources (job autonomy) foster the creation of personal resources (psychological capital) that lead to higher levels of work engagement over time (Xanthopoulou et al., 2009a).

Recently, the need to analyze the relationships between the antecedents and consequences of job crafting, as well as the concurrence of other variables in those relationships, has been emphasized (Zhang & Parker, 2019). In particular, these authors stress the

relevance of analyzing the interactive effects of contextual and individual resources (Zhang & Parker, 2019). In this regard, Cenciotti et al. (2017) found reciprocal relationships between job crafting and psychological capital, while Vogt et al. (2016) found that approach crafting predicted psychological capital and work engagement. As a first approach to exploring these possible relationships to guide further longitudinal studies (Zhang & Parker, 2019), this study, based on these recommendations and still limited empirical evidence, aims to test the serial mediation of job crafting and psychological capital in this sequence (Vogt et al., 2016), on the already proven relationship between the antecedent of job autonomy and its outcome on work engagement.

In addition, recent research has inquired into the variables that mediate the relationship between various antecedents of demands and resources and work engagement (Mazzetti et al., 2021), in particular through moderated-mediated mechanisms analysis (e.g., Tziner et al., 2019), which has yielded a more precise and complex approach to these relationships. In a similar vein, our study attempts to shed light on these work engagement mediators variables through serial mediation analysis. In doing so, we hope that our results can be used to identify the variables that contribute to facilitating work engagement and for workers and organizations to enhance them according to their capabilities.

In summary, based on the fulfillment of the assumptions analyzed in the previous section, which demonstrate the direct relationships between the constructs included in this study and the two theoretical models mentioned, the following general hypothesis is proposed:

H₄: Job crafting and psychological capital mediate the relationship between job autonomy at work as an antecedent of the work context and work engagement as a personal outcome.

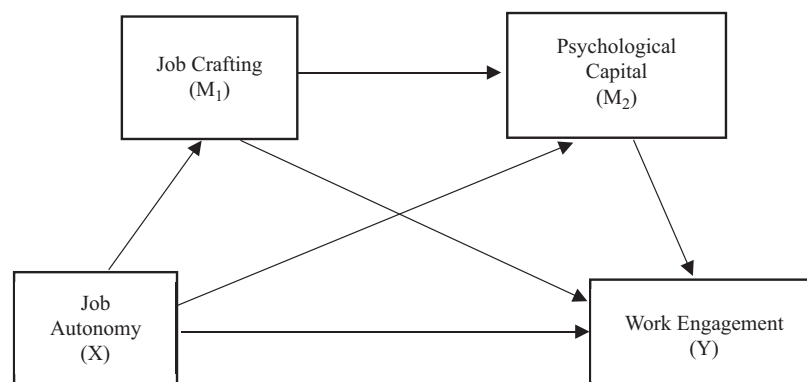


Figure 1. Mediation Model of Job Crafting and Psychological Capital in the Relationship between Job Autonomy and Work Engagement

Figure 1 summarizes the relationships between the various constructs of the present research.

Method

Procedure and Sample

The sample was selected by non-probabilistic convenience sampling. Once voluntary participation in the study had been accepted, the informed consent form was sent to the company's management committee, which, although it was attached to the questionnaire itself, was considered appropriate for it to be read by the company's management before the start of the study.

The distribution and application of the questionnaires were conducted in computerized format, through the Qualtrics platform, where the general objectives of the study, the request for participation, and the informed consent for the use of the data, as well as the battery of questions in the questionnaire, were set out. The link to the questionnaire was sent from the company's Human Resources department. The data were collected during the month of November 2020.

Participation was voluntary and anonymous. Consent was obtained from the participants before the questionnaire was administered. Ethical approval for this study was granted by the Ethics Research Committee of Rey Juan Carlos University, with the Registration Number 211020202019120. 501 workers from a company in the telecommunications sector in the Community of Madrid participated, of which 18 were discarded for not completing the questionnaire in its entirety. Therefore, the final sample was 483 workers, 65.98% of the total company workforce.

Of the 483 participants, 300 were men (62%) and 183 were women (38%), with an average age of 40 years ($SD = 8.09$), the minimum age being 23 years, and a maximum of 71 years. The levels of education were secondary education (1%), baccalaureate (7.7%), intermediate vocational training (4.8%), higher vocational training (15.4%), diploma (14.7%), degree (27.04%), undergraduate (2%), postgraduate (27.3%), doctorate (0.04%), and others (0.02%). 47.8% have been with the company for between one and three years, 20.5% for between three and five years, and 30.9% for more than five years, all of them with an open-ended employment contract and a full working day in teleworking mode. The jobs were distributed as a technician (21.70%), senior technical specialist (44.50%), coordinator (20.70%), director (13.09%), and CEO (0.01%).

Measures

Work Design Questionnaire (WDQ). Developed by Morgeson and Humphrey (2006) and validated in the

Spanish sample by Fernández Ríos et al. (2017). The items that assess the characteristics of the task were used, specifically the items related to job autonomy. This subscale consists of nine items that assess the three dimensions of the construct: Method autonomy (example item: "My job allows me to make decisions about what methods I use in doing my job"), work time autonomy (example item: "My job allows me to plan how to do my job"), and decision-making autonomy (example item: "My job gives me the opportunity to exercise my personal initiative or judgment in doing my job"). They were rated on a Likert-type scale from 1 = *strongly disagree* to 5 = *strongly agree*.

Work Engagement (UWES-3). The initial scale that measured work engagement was the Utrecht Work Engagement scale (Schaufeli et al., 2002), which contains 17 items. Subsequently, Schaufeli et al. (2006) developed an abbreviated scale (UWES-9) with nine items. Years later, Schaufeli et al. (2019) abbreviated the scale, resulting in the UWES-3, validated in five countries, including Spain. The scale includes three items assessing the three dimensions of work engagement: Vigor (example item: "I feel energized at work"), dedication (example item: "I am enthusiastic about my work"), and absorption (example item: "I am immersed in my work"). The participants were asked to rate each statement using a Likert-type scale from 0 = *never* to 6 = *always/every day*.

Job crafting (JCS). The Job Crafting scale (JCS), developed by Tims et al. (2012) and validated in Spanish in a short version by Sora et al. (2018), was used. The scale includes 12 items that assess the four dimensions of job crafting: Increasing structural job resources (example item: "In my job, I try to develop my capabilities"), decreasing job demands (example item: "In my job, I try to make my emotional activity less intense"), increasing social job resources (example item: "In my job, I ask my supervisor for advice"), and challenging job demands (example item: "In my job, when there is an interesting project, I offer to participate in it"). The participants were asked to rate each statement using a Likert-type scale from 1 = *never* to 5 = *always*.

Psychological capital (PCQ-12). It is a multidimensional scale, consisting of unidimensional constructs already used in the past: Hope (Peterson & Byron, 2008) efficacy (Stajkovic & Luthans, 1998); optimism (Luthans & Youssef, 2007), and resilience (Maddi, 1987). These four positive psychological resources have been conceptually and empirically combined by Luthans and colleagues into the higher-order construct called psychological capital (Luthans, Avolio, et al., 2007). The initial scale that measures psychological capital was created by Luthans, Avolio, et al. (2007) under the name of the Psychological Capital Questionnaire (PCQ-24), and contained 24 items. Subsequently, an

abbreviated version of the scale was created by Avey et al. (2011), with 12 items (PCQ-12), validated in a Spanish sample by León-Pérez et al. (2017). This scale includes 12 items that assess the four dimensions of psychological capital: Self-efficacy (example item: "I feel confident in contributing to discussions about my company's strategies"), resilience (example item: "At the present time, I consider that I have considerable job success"), optimism (example item: "At the present time, I am achieving the work goals I have set for myself") and hope (example item: "I can overcome difficult moments at work because I have done it before"). The participants were asked to rate each statement using a Likert-type scale from 1 = *strongly disagree* to 6 = *strongly agree*.

Control variables: Sociodemographic variables that could be covarying with the proposed mediation model were included, such as age, gender, educational level, seniority, and job position. A preliminary analysis was conducted to determine the effects of these socio-demographic variables and, if significant effects were found, to control for them. The results indicated a significant relationship between age and psychological capital ($F = 59.77, p = .01$), for age and work engagement ($F = 31.79, p = .015$), and seniority and work engagement ($F = 23.25, p = .023$). Therefore, the variables age and seniority were included in the subsequent analysis as control variables. Previous studies have shown that age shapes employee attitudes and behaviors (Paul, 2012; Zhao et al., 2021). On the other hand, job seniority predicts employee outcomes (Boğan & Dedeoğlu, 2017; Karatepe et al., 2019).

Strategy of Analysis

A descriptive analysis of the data, reliability analysis (Cronbach's alpha) and McDonald's Omega for scales with scores ($\alpha < .70$), EFA for multidimensional scales, one-factor Harman analysis to examine common method variance (CMV), Pearson's bivariate correlation analysis, and multiple serial mediation analysis controlling for age and seniority were performed. The values of the standardized normal distribution (Z) have been used. To analyze whether the direct effect between job autonomy and work engagement could be mediated by job crafting and psychological capital, or whether, in the absence of direct effects, indirect effects arise, a multiple serial mediation analysis (Model 6) was conducted. Model 6 refers to the serial mediation model of the Hayes process macro model (Hayes, 2013). The assumptions of the serial mediation analysis were met.

SPSS Statistics v.21 was used, and for the multiple serial mediation analysis, the same program was used, including the PROCESS Procedure for SPSS v.2.16

module (Hayes, 2013), with 10,000 bootstrap samples (95% confidence interval). The AMOS software was used to evaluate the fit and parsimony indexes of the complete measurement model and the structural model.

Results

Preliminary Analysis

Due to cross-sectional data collection, following Podsakoff et al. (2003), to control for common method bias, Harman's test was performed for a single factor, with 10 different factors explaining 64.8% of the total variance. The first factor only captured 25.4% of the variance of the total data, so since no single factor emerged from the factor analysis, nor did any single factor explain more than half of the total variance, the results suggest that there is no CMV problem in this study (Podsakoff et al., 2003). In addition, because of the cross-sectional data collection, alternative models were tested to ensure that the hypothesized model was the most parsimonious. In addition to the direct effect between autonomy and work engagement, Model 2 hypothesized the indirect effect serial mediation role of job crafting and psychological capital, and model 3 did not consider direct effect at all. The model fit was estimated using maximum likelihood path analysis (Hu & Bentler, 2009). Fit indices recommended by Hu and Bentler (2009) were used for comparison (comparative fit index [CFI] > .95 and root mean square error of approximation [RMSEA] < .08). To compare the relative fit of the model and the two model variations the information criterion of Akaike (1987) was used, as recommended by Loehlin (1998). Regarding the comparative fit, the best fitted model according to Akaike's information criterion was Model 1 (the original model), which explains 24.6% of

Table 1. Fit Indices for the Three Variation Model

Models	χ^2	df	CFI	TLI	RMSEA	SRMR	AIC	R ²
M1	6.70*	2	.99	.93	.07	.02	30.70	.246
M2	98.34*	2	.73	.35	.31	.13	122.34	
M3	102.29*	3	.72	.07	.26	.12	124.29	

Note. $N = 483$. Figures in bold meet Hu & Bentler (2009) criteria for good fit for small samples. M1 = Multiple serial mediation model of job crafting and psychological capital in the relationship between job autonomy and work engagement; M2 = Multiple serial mediation model with direct effect; M3 = Multiple serial mediation model without direct effect; AIC = Akaike information criterion; CFI = comparative fit index; TLI = Tucker Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

* $p < .05$.

the variance of work engagement. As for the overall fit, the fit indices of the three models are presented in Table 1. Model 1 is the only one of the three models that shows a good fit, meeting the criteria of (Hu & Bentler, 2009) for a good fit with small samples. Models 2 and 3 had a worse fit as Table 1 shows.

Measurement Model

The reliability of the constructs was analyzed using Cronbach's alpha: Job autonomy ($\alpha = .81$), job crafting ($\alpha = .68$), psychological capital ($\alpha = .85$), and work engagement ($\alpha = .61$). McDonald's Omega was also calculated for scales with scores ($\alpha < .70$), obtaining acceptable values for both of them ($W_{\text{engagement scale}} = .74$ and $W_{\text{job crafting scale}} = .70$).

For those multidimensional scales (Work Design Questionnaire, job crafting scale, and psychological capital scale), a comparison was carried out between a factorial model based on an initial Exploratory Factor Analysis (EFA), an unifactorial model, and the one based on the theoretical framework.

All the theoretical models used for measuring the variables became the most parsimonious, following Akaike's information criterion (Akaike, 1987). In addition, parsimony norm fit index (PNFI) results ranged between .55 to .70, what means an acceptable fit (Mulaik et al., 1989), and the appropriate use of multidimensional measurements models in this research. The theoretical models showed the following results: *The Work Design Questionnaire*, showed an arguable fit ($\chi^2 = 197.39$; $df = 24$; CFI = .96; TLI = .92; RMSEA = .12; SRMR = .0597) because the RMSEA is well above the cutoff ($< .08$), but considering the sample size and the small degree of freedom, the RMSEA is known to not fully perform (Kenny et al., 2015). *The job crafting scale* showed an adequate adjustment ($\chi^2 = 126.38$; $df = 48$; CFI = .90; TLI = .84; RMSEA = .06; SRMR = .0483) and consequently confirm the validity of the instrument. Finally, for *the psychological capital scale*, the results also

accounted for right adjustment ($\chi^2 = 136.43$; $df = 48$; CFI = .95; TLI = .93; RMSEA = .06; SRMR = .0385).

Structural Model - Hypothesis Testing

Table 2 presents the descriptive and correlational analysis for the main variables and control variables. Correlation analyses showed positive, low and significant correlations between job autonomy and work engagement ($r = .29$; $p < .01$), a result that allows for verify H_1 , and between job autonomy and job crafting ($r = .27$; $p < .01$). The correlation between job autonomy and psychological capital was positive, moderate and significant ($r = .48$; $p < .01$). On the other hand, there was a positive, low and significant correlation between job crafting and work engagement ($r = .26$; $p < .01$) and a positive, moderate and significant correlation between psychological capital and work engagement ($r = .49$; $p < .01$), results that verify H_2 and H_3 , respectively. Finally, the correlation between job crafting and psychological capital was positive, moderate and significant ($r = .39$; $p < .01$). Therefore, correlation analyses showed that all correlations between the main variables of the research were significant, which allows us to verify that the assumptions of relationships between variables required to test a multiple serial mediation model were met (Hayes, 2013). Regarding control variables, correlation analyses showed positive, low and significant correlations between age and job autonomy ($r = .29$; $p < .01$), between age and work engagement ($r = .18$; $p < .01$), between age and psychological capital ($r = .19$; $p < .01$) and between seniority and age ($r = .30$; $p < .01$).

To test our mediation hypothesis, a multiple serial mediation analysis was performed with Macro Process (Model 6), developed by Hayes (2013) with 10,000 bootstrap samples (95% confidence). A graphical representation of the model is shown in Figure 2.

Regarding Hypothesis 4, as shown in Table 3, we employed a multistep process to test the double mediation model. In the first step (model on job crafting) job

Table 2. Descriptive and Correlational Analysis

Variables	M	SD	1.	2.	3.	4.	5.	6.
Main variables								
1. Job autonomy	4.09	.79	–					
2. Work engagement	5.91	.96	.29**	–				
3. Job crafting	5.38	.65	.27**	.26**	–			
4. Psychological capital	4.68	.67	.48**	.49**	.39**	–		
Control variables								
5. Age	40.48	8.09	.12**	.18**	.02	.19**	–	
6. Seniority	2.83	0.87	–.01	–.05	–.05	.02	.30**	–

Note. $N = 483$.

* $p < .05$. ** $p < .01$.

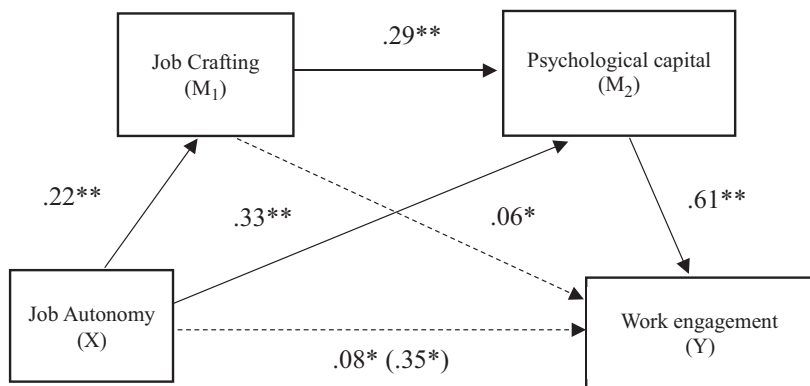


Figure 2. Summary of the Multiple Serial Mediation Analysis Model of Job Crafting and Psychological Capital in the Relationship between Job Autonomy and Work Engagement

Note. $N = 483$. The dashed line represents non-significant effects.

* $p < .05$. ** $p < .01$

Table 3. Multiple Serial Mediation Analysis Model

Models and Variables	B	SE	t	p	95% IC	R _{adjusted} ²	Correspondence with hypotheses
Model on job crafting						.78**	
Constant	4.47	.15	30.70	< .01**			
Job autonomy	.23	.35	6.44	< .01**			
Model on PsyCap						.30**	
Constant	1.69	.23	7.45	< .01**			
Job crafting	.298	.04	7.25	< .01**			
Job autonomy	.339	.03	10.25	< .01**			
Indirect effect job autonomy-job crafting- PsyCap							
Indirect effect	.067	(Boot) .002			[.035, .107]		
Model on work engagement						.26**	
Constant	2.37	.35	6.78	.00			
Job crafting	.06	.06	.97	.33			H ₂
PsyCap	.61	.07	9.29	.00			H ₃
Job autonomy	.09	.05	1.73	.09			H ₁
Total effect job autonomy on work engagement							
Job autonomy	.35	.05	6.95	.00			
Direct effect job autonomy on work engagement							
Job autonomy	.08	.05	1.73	.08			
Indirect effect job autonomy-job crafting-PsyCap-work engagement							
Standardized indirect effect	.22	(Boot) .26			[.17, .27]		H ₄
Ratio of indirect effect to total direct effect							
Job autonomy-job crafting- PsyCap -work engagement	.74						

Note: $N = 438$. H₁ = Hypothesis; H₂ = Hypothesis 2; H₃ = Hypothesis 3; H₄ = Hypothesis 4.

* $p < .05$. ** $p < .01$.

autonomy reflected a positive and significant relationship with job crafting ($M_{effect} = 0.225$, $SE = 0.349$, $t = 6.442$, $p < .01$). In the second step (model on psychological capital), the direct effect of job autonomy on psychological capital was significant ($M_{direct\ effect} = .339$, $SE = 0.03$, $t = 10.25$, $p < .01$), and the indirect effect through job crafting was significant, $M_{indirect\ effect} = .067$,

$SE_{boot} = 0.019$, 95% CI [0.035, 0.107], suggesting that the job autonomy-psychological capital is mediated by job crafting. In third step (model on work engagement), job autonomy had no significant relationship with work engagement ($M_{effect} = 0.092$, $SE = 0.053$, $t = 1.729$, $p = .08$), job crafting had no significant relationship with work engagement ($M_{effect} = 0.06$, $SE = 0.063$, $t = 0.968$, $p = .33$),

but psychological capital had a significant positive relationship with work engagement ($M_{effect} = .612, SE = 0.06, t = 9.29, p < .01$). The total effect of job autonomy on work engagement was positive and significant ($M_{total\ effect} = .354, SE = 0.05, t = 6.946, p < .01$), as the indirect effect of the job autonomy-job crafting-psycap-work engagement relationship was significant, $M_{indirect\ effect\ (Standardized)} = .221, SE_{Boot} = 0.26, 95\% CI_{Boo} [0.17/0.27]$. The ratio of the indirect effect to the total effect showed that a significant proportion of the variability is explained by the hypothesized double mediation model ($M_{ratio\ effect} = 0.74$). In conclusion, the job autonomy-work engagement relationship is mediated by job crafting and psychological capital, supporting Hypothesis 4.

Discussion

The present study has aimed to identify the relationships between job autonomy, job crafting, psychological capital, and work engagement.

Given the importance of work engagement as an organizational outcome (Frederick & VanderWeele, 2020), it is necessary to deepen the antecedents of work engagement by exploring the joint role of job autonomy (i.e., an organizational resource), job crafting, and psychological capital (i.e., individual resources).

The research begins by testing relationships among variables. The results reveal that work engagement is related to (a) job autonomy (Hypothesis 1); (b) job crafting (Hypothesis 2) and (c) psychological capital (Hypothesis 3). This would be in line with previous literature on the relationships between (a) work engagement and job autonomy (e.g., Bakker et al., 2006; Bakker, Hakanen et al., 2007; Halbesleben, 2010; Kao et al., 2021; Ng and Feldman, 2014), (b) work engagement and job crafting (e.g., Frederick & VanderWeele, 2020; Letona-Ibañez et al., 2021; Park et al., 2020; Tims et al., 2013), and (c) work engagement and psychological capital (e.g., Avey et al., 2008; Grover et al., 2018; Mazzetti et al., 2021).

The following, based on the JD-R model (Bakker & Demerouti, 2007) and COR theory (Hobfoll, 1989), this research has proposed that job crafting, and psychological capital mediate the relationship between job autonomy as an antecedent of the work context and work engagement as a personal outcome (Hypothesis 4). The results confirmed the multiple serial mediation hypothesis. These findings are in line with the JD-R model (Bakker & Demerouti, 2007), which assumes a motivational process in which job resources (job autonomy) and personal resources (psychological capital) are antecedents of work engagement (Airila et al., 2014; Bakker, Tims, et al., 2012; Schaufeli et al., 2008; Xanthopoulou et al., 2009a). The JD-R model also explains job crafting as being mediating, along with psychological

capital. Thus, job crafting is driven by job characteristics. Although these characteristics may differ depending on the job (Wang et al., 2017), employees can modify the levels of job demands and job resources (job autonomy) of their job to better match their own skills and preferences. Some previous studies have shown how job crafting mediates the relationship between variables such as work engagement and job performance (Robledo et al., 2019), and/or the relationship between psychological capital and satisfaction (Cenciotti et al., 2017). However, no previous research has been found that analyses job crafting as a mediating variable between job autonomy and work engagement, which represents an original contribution of this study, and whose results should be verified in further longitudinal research (Zhang & Parker, 2019).

In turn, the results show that the effect between the independent variable (job autonomy) and the dependent variable (work engagement) was exclusively indirect through the other variables that acted as mediators (job crafting and psychological capital), with the direct effect not being significant (although it was very close to significance, $p = .08$). This finding implies that job autonomy is beneficial up to a certain level and, if not managed or involves an excess in job resources, can turn expected positive outcomes into negative ones (Kubicek et al., 2017; Shahzad, 2021)). In turn, this result reinforces the mediation hypothesis put forward in the present study: Job autonomy requires job crafting and psychological capital to influence work engagement.

On the other hand, the results of this study have shown that job crafting does not significantly mediate the relationship between job autonomy and work engagement. In turn, the direct effect of job crafting on work engagement is not significant. This is because job crafting requires psychological capital. This statement can be explained on the grounds that the personal resources contained in psychological capital are important for the performance of the work tasks on which job crafting is based (Christian et al., 2011; Rich, 2017). In addition, dimensions of psychological capital help to increase levels of job crafting: (a) Employees are more likely to craft their jobs and tasks when they are optimistic (Luthans, Youssef, et al., 2007), (b) are more flexible to demanding demands when they have high levels of resilience (Minseo & Beehr, 2021), (c) manifest internal locus of control and need for achievement when they have high levels of hope, both necessary for job crafting (Luthans, Avolio, et al., 2007) and (d) employees with high levels of self-efficacy, enhance their job crafting (van den Heuvel et al., 2015).

The results have also shown a statistically superior indirect effect of the mediation of psychological capital to the joint measurement of job crafting and psychological capital. These results are in line with those

obtained by Ahsan et al. (2019) and Muneeb and Maochun (2019). On the other hand, there is research confirming psychological capital as a mediator in the job crafting and work engagement relationship (Arasli et al., 2019; Uen et al., 2021). This mediation is along the lines of person-environment (P-E) fit (Edwards & Cooper, 1990), which is based on the fact that the strength of the relationship between job characteristics and work behaviors depends on the level of personal resources. P-E fit presents an individual's desirable and preferred work conditions (Edwards & Cooper, 1990).

Based on the JD-R model, personal resources (i.e., psychological capital) provide individuals with an ability to influence job demands, job resources, and outcomes of work (Grover et al., 2018). Workers consider cognitive resources as high-value assets, so they try to preserve them (Hobfoll, 1989). Thus, when employees strengthen their personal resources, they will be more engaged at work. Furthermore, in accordance with COR theory (Hobfoll, 2011), the results of the present research indicate that labor resources and psychological capital have created a resource caravan process. According to this, the availability of job resources (job autonomy) acts as a caravan passageway that triggers a process of resource accumulation, which in turn mobilizes personal resources (i.e., psychological capital). Job and personal resources foster the motivational process, proposed by the JD-R model, which leads to a positive state of work engagement. The fact that psychological capital is a mediator with a superior indirect effect in statistical terms also has to do with the fact that job resources are a positive factor for work engagement, but can act negatively if conditions such as psychological capital are not present (Muneeb & Maochun, 2019). As the level of job autonomy at work increases, employees need more psychological resources to cope with additional challenges in decision making (O'Donnell et al., 2015). These results are in line with recent research by Bakker and van Wingerden (2021), in which personal resources intervention increases work engagement.

This study has some limitations that should be considered. Although the sample is relatively large and heterogeneous, it would have been interesting to be able to apply it in other organizations, activity sectors, and countries to assess occupational and cultural differences. Our data are cross-sectional in nature, so the relationships found should be confirmed in longitudinal studies that include several temporal measures and test for possible causal relationships between variables. Thus, future studies should test the present model longitudinally, which would allow more definitive causal conclusions, or perhaps reveal reciprocal relationships (Cenciotti et al., 2017). Another direction of future research could include adding performance data, as this would provide

much information on how the investigated behaviors influence worker outcomes. Regardless, the analyses have revealed significant associations between the study variables. This study extends knowledge on the antecedents of work engagement, explaining that job crafting, and psychological capital are factors for work engagement. In addition, the present study sheds light on the associations between job resources and work engagement by providing evidence that job crafting and psychological capital are new mediators explaining the relationships between these variables. Moreover, psychological capital being the strongest mediator in statistical terms can be integrated into future research and intervention programs to foster the influence of job resources and improve work engagement levels in organizations.

Business organizations need to act from a positive level of psychology (Luthans & Avolio, 2009; Luthans, 2016; Seligman et al., 2005) and focused on increasing work engagement. To achieve this, business environments must develop policies focused on encouraging job crafting in work behaviors by employees. With respect to job crafting, managers must cultivate a work environment that fosters employee initiatives (Petrou et al., 2012). Empowerment through job crafting, which allows employees to adjust their work to their needs and preferences, can promote desirable work behavior (Demerouti et al., 2015). In addition, it is advisable to work on developing this resource seeking and adaptation that job crafting facilitates to challenge job demands (Petrou et al., 2012). It can also be useful to strengthen talent retention and development policies, as well as to reduce turnover rates (Vogt et al., 2016). On the other hand, it can be useful for HR departments to inform employees on how to develop job crafting behaviors so that they can modify their tasks by themselves, autonomously. In today's world of work, it is not feasible for managers to accurately predict changes and assign roles correctly to their teams (Griffin et al., 2017). Consequently, it might be interesting if job crafting could be encouraged, rather than exhaustive task assignments.

In its favor, working on psychological capital could become one of the business practices with more potential to be developed. Considering that psychological capital may not be possessed by all employees, it could be enhanced through specific training programs (Luthans & Youssef-Morgan, 2017). Group training programs where positive psychology is used to extend psychological capital behaviors are also recommended.

It is concluded that in order to foster work engagement, it is necessary for workers to have more job resources such as job autonomy (Bakker et al., 2014; Bakker, 2015), as such resources enable them to proactively design their tasks through job crafting (Cenciotti et al., 2017; Kraimer et al., 2011) and to have

personal resources such as psychological capital, which allow them to cope with their daily lives (Sesen & Ertan, 2020).

The results of the present research have shown a significant mediation of job crafting and psychological capital in the positive relationship between job autonomy and work engagement. In this mediation, job crafting did not mediate significantly if it was not associated with psychological capital. On the other hand, psychological capital had a statistically superior indirect effect than job crafting as a mediator of the relationship between job autonomy and work engagement.

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