

# Psychological Capital Moderates the Indirect Effect of Job Crafting on Work Engagement Through Basic Psychological Need Satisfaction

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## Abstract

*Based on the Job Demands–Resources (JD-R) model and Self-Determination Theory (SDT), this study tested whether satisfaction of basic psychological need is a mediator in this relationship between job crafting and work engagement, and whether psychological capital (PsyCap) moderates this mediating relationship. Cross sectional survey data was gathered from 412 full-time employees from five different industry sectors. Job crafting, basic psychological need satisfaction, psychological capital, and work engagement were measured using the following scales: 21-item Job Crafting Scale, 18-item Work-related Basic Need Satisfaction scale, 24-item Psychological Capital Questionnaire, and nine-item Utrecht Work Engagement Scale. Ordinary least squares regression (OLS) using PROCESS model 7 with 5,000 bias-corrected bootstrap resamples was used to estimate a first stage moderated-mediation model in SPSS. The relationship between job crafting and work engagement was positive ( $c = 0.739, p < .001$ ) and need satisfaction as a mediator was significant (indirect effect = 0.405, 95% CI [0.316, 0.508]). The result of the job crafting  $\times$  psychological capital interaction significant predicted need satisfaction ( $a_3 = 0.227, p < .001$ ) and the index of moderated mediation was significant (index = 0.221, 95% CI [0.127, 0.315]). Conditional indirect effects (CIs all do not contain zero) increased sequentially from low (0.176), mean (0.332), to high (0.487) levels of psychological capital. Psychological capital therefore acts as a personal resource which bolsters the motivational returns of job crafting and need satisfaction is a proximal mechanism between proactive job redesign and engagement.*

**Keywords:** *job crafting; work engagement; basic psychological need satisfaction; psychological capital; self-determination theory; moderated mediation.*

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## 1. Introduction

For organizations that work in a rapidly changing, knowledge-driven world, maintaining employee engagement is a major issue. Work engagement is a positive and fulfilling state of mind characterised by vigor, dedication and absorption (Schaufeli et al., 2002) and has consistently been found to be related to in-role and extra-role performance, and organisational commitment as well as lower turnover intention. Engagement has been defined as a finite, but renewable, state of mind, so scholars' focus has moved from only top-down job design to bottom up, employee-initiated behaviors that co-construct tasks and relationships. One of the most theoretically generative of

these pro-active behaviours is job crafting, which is a change in the work sphere initiated by the employee to change the demands and resources required to perform the job in a way that better fits the preferences, motives and abilities of the employee (Tims & Bakker, 2010; Wrzesniewski and Dutton, 2001).

While there is an increasing stream of evidence showing a positive link between job crafting and engagement (Bakker et al., 2012; Rudolph et al., 2017), two questions remain unresolved. In fact, there is no general consensus about the motivational mechanism that links job crafting to job engagement. While Job Demands – Resources theory is somewhat vague about what it takes to translate these structural changes into energy and enthusiasm, it does state that crafting increases resources and optimizes challenge demands (Demerouti et al., 2001, Tims et al., 2012). Self-Determination Theory (Deci & Ryan, 2000; Ryan & Deci, 2000) stands out as a good possibility: Satisfaction of the three basic psychological needs for competence, autonomy, and relatedness. If employees are able to create their working environment such that these needs can be fulfilled, and need fulfillment is in turn a good predictor of self-determination in motivation and wellbeing at work (Van den Broeck et al., 2016). Basic psychological need satisfaction could thus directly be investigated as mediating roles.

Second, the potency of the job-crafting-to-engagement process is not expected to be the same for all employees. Individuals' abilities to utilize the opportunities afforded by their environments are a function of personal resources, positive self-assessments that are related to resiliency and sense of control (Hobfoll, 2002). Among the cluster of personal resources, psychological capital (PsyCap), a higher order construct incorporating the concepts of hope, efficacy, resilience and optimism (Luthans, Youssef, & Avolio, 2007), is the most widely validated in the literature relevant to organizational studies. Employees with high levels of PsyCap should be able to find more motivational value in the same crafting behaviors, because they will be more confident in working toward their self-set goals, they will be more likely to create alternative responses when they encounter a blockage and they will see failure as surmountable (Avey et al., 2011; Luthans & Youssef-Morgan, 2017). Thus, PsyCap can serve as a boundary condition which can boost the relationship of job crafting and need satisfaction, and further, need satisfaction and engagement.

Building on JD-R theory and SDT, this study goes one step further and tests a first stage moderated-mediation model in which the mediation path between job crafting and the response of work engagement is moderated by psychological capital as first stage of the mediation path. The study makes the following contributions: (a) it specifies need satisfaction as the proximal SDT mechanism that connects a JD-R behavior to a JD-R outcome – the two dominant motivational frameworks; (b) it applies bootstrapped conditional process analysis and the formal index of moderated mediation (Hayes, 2015, 2018) to test the conditional indirect effect; and (c) clarification on for whom job-crafting is likely to produce the greatest engagement returns. In addition to these contributions to theory, the study seeks to answer three empirical questions. First, basic need satisfaction has been little quantified in one single integrated modelling in evidence that

approach-oriented crafting is related to engagement, while meta-analytic evidence reveals a strong positive association between them (Rudolph et al., 2017). Second, previous research on moderators of the relationship between job crafting and engagement has largely focused on the main effect of a personal resource rather than the conditional links between job crafting, personal resource, and engagement. The current design focuses on a particular point in the model that allows the investigation of when the personal resources gain or lose explanatory power, namely when they are placed first in a moderated-mediation model. Third, most literature has focused on small-to-moderate samples and used the traditional null-hypothesis significance tests for indirect effects; the present study has subjected the data to a larger sample, a formal moderated mediated index, and 5,000 bias corrected bootstrap resamples, and thus provided a higher inferential standard.

## **2. Theoretical Background and Hypothesis Development**

### ***2.1 Job Crafting and the JD-R Framework***

Wrzesniewski and Dutton (2001) originally defined the crafting of jobs as physical, cognitive and relational changes that people make in either their task and/or relation boundaries to modify the meaning and identity of their work. Tims and Bakker (2010) later recast the construct in the context of JD-R theory as self-initiated change behaviors employee perform to enact a balance between the job demands and job resources on the one hand and their own abilities and needs on the other. Tims, Bakker, and Derks (2012) validated and turned this conceptualization into a four-dimensional instrument which represented an increase in structural job resources, in social job resources, in challenging job demands and in a decrease in hindering job demands. According to JD-R theory, energy flows are activated by the combinations of resources and well-calibrated challenge demands, which ultimately lead to engagement, while hindering demand lead to energy exhaustion (Bakker & Demerouti, 2007). Crafting employees seek out a more motivating work situation by proactively changing these elements.

New reviews focus the dissimilarity between the four dimensions of crafting with their motivational footprints. Increase in SRs and ARs is generally considered to be approach-related crafting, which tends to link to benefits like engagement, meaningfulness of work and performance. Reduction of hindering demands corresponds to avoidance-oriented crafting behavior outlined above and is not as consistently and in some cases negatively related to engagement (Lichtenthaler & Fischbach, 2019). However, at the composite level, the approach crafting at every day workplaces is predominant, resulting overall positive total relationship with engagement, the focussed variable of the present model. The composite is also as a theory, suitable if the research questions concern a generalized motivational mechanism, instead of a dimension-specific effect.

### ***2.2 Work Engagement***

Work engagement can be viewed as an ongoing, positive affective-motivational state of fulfillment that consists of three dimensions: Vigor: Resilience to wear out and high energy levels; Dedication:

a sense of enthusiasm, identification, and absorption into work; Absorption: Full, happy and enthusiastic concentration on work (Schaufeli et al., 2002, 2006). According to JD-R theory, engagement is the main result of the motivational process and the bridge between the resources and its positive outcomes in the organization (Schaufeli & Bakker, 2004). Job crafting is conceived as a proximal antecedent of engagement that can elicit similar, “state-like” changes in employees as a result of their actions and intentions within their workplaces. One predictor of in-role performance, organizational citizenship behavior, customer satisfaction and reduced turnover that is consistently endorsed in an empirical sense is engagement. As engagement is a reflection of energy put into a role-related activity, it is also sensitive to role-related conditions (e.g., autonomy, social support) and to person-level conditions (e.g., efficacy, optimism), and thus is a suitable outcome for testing models that incorporate role-related as well as person-related conditions.

### ***2.3 Job Crafting and Work Engagement***

The construction of resources by crafting should trigger the JD-R motivational chain of action and boost engagement due to the increased resources and optimized challenges after crafting in a job. However, in empirical studies, both cross-sectional studies and longitudinal studies report positive relationship between approach-oriented job crafting and engagement (Bakker et al., 2012; Tims et al., 2013), and in terms of meta-analysis, it has been confirmed that approach-oriented job crafting is positively and reliably related with engagement (Lichtenthaler & Fischbach, 2019; Rudolph et al., 2017). The longitudinal evidence is particularly telling, as it dismisses the notion that there is a “halo effect” in that people who are engaged are more likely to report crafting, as Bakker et al (2012) found Proactive personality predicted later crafting which in turn predicted later engagement, controlling for prior engagement. Tims et al. (2013) also found a change in the job resources and hindering demands to be associated with decreases in hindering demands and increases in job resources, whereas engagement had no impact on these changes. Following the high level of approach crafting in the composite as a whole, a positive total relationship should be expected.

### ***2.4 Basic Psychological Need Satisfaction as a Mediator***

Self-Determination Theory theorises that there are three fundamental human psychological needs that must be satisfied, for autonomous motivation, growth and well-being: autonomy (volition and psychological freedom), competence (effectiveness and mastery), and relatedness (belonging and connection) (Deci & Ryan, 2000; Deci et al., 2017). These needs are similar in that they have universal motivational role and unlike acquired motives, the activities that satisfy them vary among cultures and contexts. Van den Broeck et al. (2010) adapted such needs into an occupational context by creating the Work-related Basic Need Satisfaction scale, showing that a correlation between the three aspects and the mediational nature of need satisfaction between job characteristics and the outcome variables of engagement and exhaustion. A later review (van den Broeck et al., 2016) synthesized a wealth of evidence from over ninety primary research studies

and found the three needs to function as proximal motivational mechanisms connecting work environment to attitudes, behaviors and well-being.

In theory, job crafting is well suited to fulfil all three needs. The level of structural resources and challenge demands increases to provide more opportunities for competence—skills to develop and apply. Selecting what and how to craft represents exercising autonomy, and by definition, crafting is an action that is initiated by the employee, determines how to change, and is a choice about what to change. Encouraging more social job resources enhances relatedness by fostering deeper collegial relationships, more supportive relational ties, and reciprocal relationships. Need satisfaction, in turn, results in energizing and directing organisation of behaviour, leading ideally to vigour, dedication, and absorption, characteristic of engagement. According to this, it is suggested that basic psychological need satisfaction will be a pathway through which the effects of job crafting will pass into engagement.

### ***2.5 Psychological Capital as a First-Stage Moderator***

While job crafting generates opportunities for need satisfaction, the amount of such need satisfaction experienced should be guided by the personal resources that employees provide in this crafting. PsyCap a state-like higher-order resource with its four dimensions - self-efficacy, hope, resilience and optimism - (Luthans, Avolio, Avey, & Norman, 2007) represents the positive evaluation of situations and the chances of engaging in desired positive thoughts, feelings, actions and behaviors in light of motivated efforts and perseverance. The motivational aspect of each facet is self-efficacy (provides confidence to try hard challenges), hope (provides agency and pathways for self-directed goals), resilience (provides recovery from setbacks), and optimism (provides positive expectancies and future outcomes). Overall, there is a positive relationship between PsyCap and measures of attitude (engagement and satisfaction), in-role and citizenship performance measures, and measures of well-being (Avey et al., 2011). Conservation of Resources theory (Hobfoll, 2002) and the broaden-and-build approach (Fredrickson, 2001) lead one to expect high-PsyCap employees will successfully transform crafting actions into need satisfaction more effectively. Efficacy and hope provide the confidence and avenues for challenge seeking crafting for competence and autonomy. Resilience allows for crafting effort in the face of challenges and prevents that setback stopping the behavior, just as it helps prevent the actual behavior being extinguished. Optimism is to put a positive spin on creating outcomes, and it's to reinforce relatedness and volition. In turn, when PsyCap is low, the same crafting behaviors should lead to comparatively low levels of need satisfaction as the individual does not have the motivational resources to "capitalize" on the crafting behavior. Thus, it is proposed that PsyCap could moderate the first part of the indirect pathway the job-crafting-to-need-satisfaction pathway.

### **3. Hypotheses**

Based on the foregoing rationale, six hypotheses are advanced. Each is stated in null ( $H_0$ ) and alternative ( $H_a$ ) form.

**H1<sub>0</sub>**: Job crafting has no significant effect on work engagement.

**H1<sub>a</sub>**: Job crafting has a significant positive effect on work engagement.

**H2<sub>0</sub>**: Job crafting has no significant effect on basic psychological need satisfaction.

**H2<sub>a</sub>**: Job crafting has a significant positive effect on basic psychological need satisfaction.

**H3<sub>0</sub>**: Basic psychological need satisfaction has no significant effect on work engagement.

**H3<sub>a</sub>**: Basic psychological need satisfaction has a significant positive effect on work engagement.

**H4<sub>0</sub>**: Basic psychological need satisfaction does not significantly mediate the effect of job crafting on work engagement.

**H4<sub>a</sub>**: Basic psychological need satisfaction significantly mediates the effect of job crafting on work engagement.

**H5<sub>0</sub>**: Psychological capital does not significantly moderate the effect of job crafting on basic psychological need satisfaction.

**H5<sub>a</sub>**: Psychological capital significantly moderates the effect of job crafting on basic psychological need satisfaction.

**H6<sub>0</sub>**: The indirect effect of job crafting on work engagement through basic psychological need satisfaction is not significantly conditional on psychological capital.

**H6<sub>a</sub>**: The indirect effect of job crafting on work engagement through basic psychological need satisfaction is significantly conditional on psychological capital.

#### **4. Method**

To examine the proposed first-stage moderated-mediation model, a cross-sectional, self-report survey design was used. The sample group targeted were white and blue collar full-time workers in various industry sectors. After the institutional ethical approval the questionnaire was sent via organizational HR contact persons and professional networking. Consent was voluntary, anonymous, no information was gathered that identified the respondents, and they were told data would only be analysed in aggregate and would be released without consequences if they wished to withdraw. Two attention items were used and careless responders (who failed both attention items or whose mean completion time was less than one third of the median) were eliminated from the analysis. Of the 450 workers who responded, 412 remained after discarding incomplete records and workers who were careless responders. An a priori power analysis for this sample suggested that the power to detect a medium-sized indirect effect with conditions similar to those in the current model exceeds .99, which far exceeded common guidelines for conducting a conditional process analysis using bootstrap.

All multi-item constructs were measured using previously validated instruments and composite scale scores were calculated as the mean of the items with higher scores representing a higher

standing on the construct. The full 21-item, four-dimension Job Crafting Scale (JCS; Tims et al., 2012; rated on a 5-point scale from 1 being “never” to 5 being “very often”), assessing increasing structural job resources, increasing social job resources, increasing challenging job demands, and decreasing hindering job demands, was administered to measure job crafting. Basic psychological need satisfaction at work was assessed using the Work-related Basic Need Satisfaction scale (W-BNS; Van den Broeck et al., 2010), which measures satisfaction of the needs for autonomy (6 items), competence (6 items) and relatedness (6 items) on a 5 point Agree/Disagree scale (scoring ranged from 1 = “totally disagree” to 5 = “totally agree”); negatively worded items were reverse scored and then aggregated. Psychological capital was assessed using the 24-item Psychological Capital Questionnaire (PCQ-24; Luthans, Avolio, Avey, & Norman, 2007) with four subscales, each having six items, that were theoretically and previously validated as higher order factors of self-efficacy, hope, resilience, and optimism (measured on scales ranging from 1, strongly disagree, to 6, strongly agree). To assess work engagement, the nine-item Utrecht Work Engagement Scale (UWES-9; Schaufeli, Bakker, & Salanova, 2006) was used, consisting of three dimensions—vigor, dedication, and absorption (three items each), which were rated on a seven-point scale of the frequency of occurrence of the items (ranging from 0 = never to 6 = always/every day). Table 1 provides a summary of the constructs, their dimensional structure, response anchor and number of items.

**Table 1:** *Constructs, Measurement Instruments, Dimensional Structure, and Response Scaling*

Construct (role)	Instrument (source)	Dimensions	Items	Response scale
Job crafting (X)	Job Crafting Scale (Tims et al., 2012)	Structural resources; social resources; challenge demands; hindering demands	21	1–5 (never–very often)
Need satisfaction (M)	W-BNS (Van den Broeck et al., 2010)	Autonomy; competence; relatedness	18	1–5 (totally disagree–totally agree)
Psychological capital (W)	PCQ-24 (Luthans et al., 2007)	Self-efficacy; hope; resilience; optimism	24	1–6 (strongly disagree–strongly agree)
Work engagement (Y)	UWES-9 (Schaufeli et al., 2006)	Vigor; dedication; absorption	9	0–6 (never–always)

*Note.* X = predictor; M = mediator; W = moderator; Y = outcome. W-BNS = Work-related Basic Need Satisfaction scale; PCQ-24 = Psychological Capital Questionnaire; UWES-9 = Utrecht Work Engagement Scale. Composite scores are item means.

The IBM SPSS Statistics software and the PROCESS macro (Hayes, 2018) were used for analyses. Before the data was analysed for hypothesis testing, missing data, univariate outliers, data normality and internal-consistency reliability were analysed using Cronbach's alpha. Pearson correlation of zero order was calculated and descriptive statistics were calculated. To check for

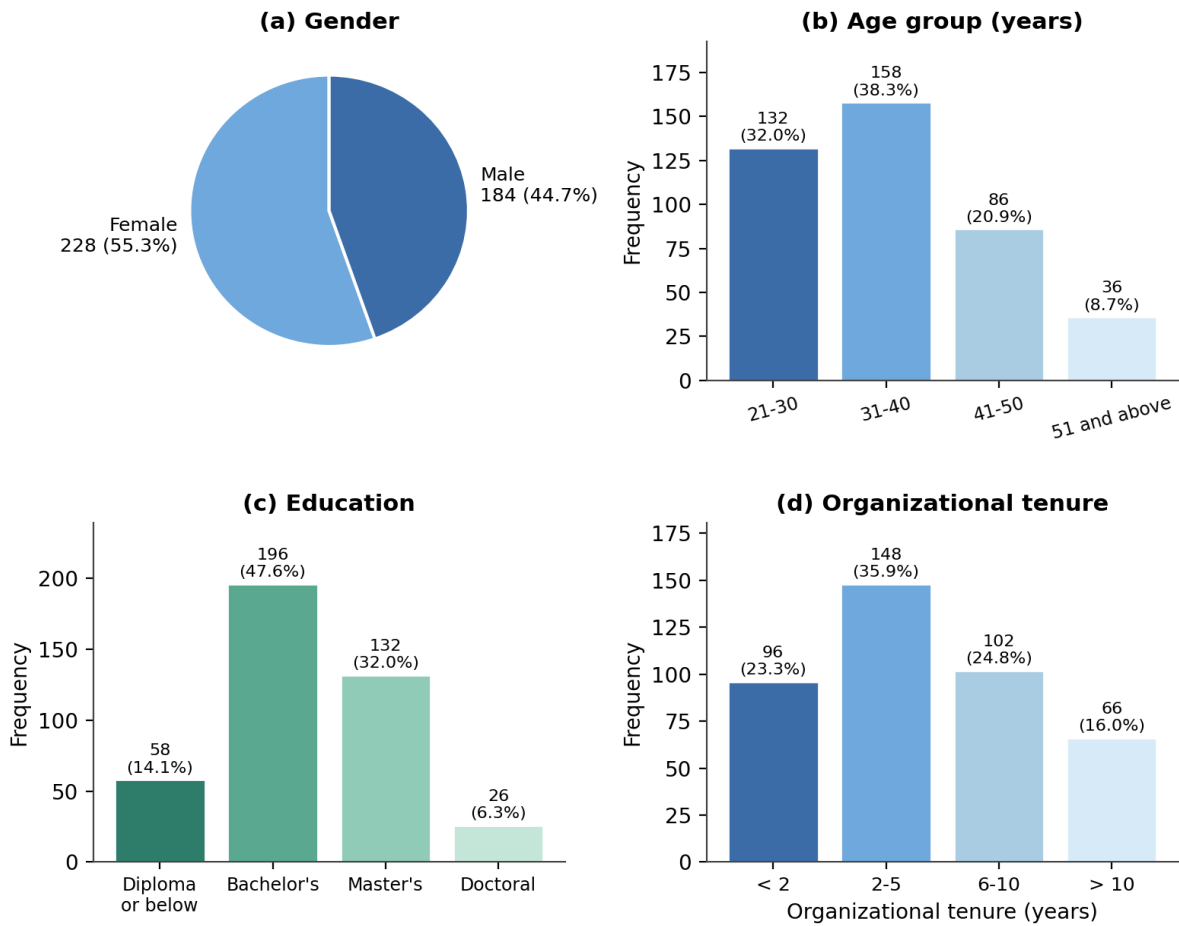
multicollinearity, variance inflation factors (VIF) were analyzed; the Durbin–Watson statistic and standardized-residual plots were analyzed to standardize the assumptions of linear regression: linearity, homoscedasticity, independence of residuals, and normality of residuals. Harman's single-factor test was used to test common method bias, and all items from all constructs were subjected to an exploratory factor analysis and the unrotated solution examined, with the criterion that if a single factor explains 50% or more of the variance, it would indicate that method bias is serious (Podsakoff et al., 2003). Simple and multiple linear regressions were used to test hypotheses H1 – H3. Bootstrap mediation analysis (PROCESS Model 4) was used for the testing of H4. H5 was tested using moderated multiple regression with a mean-centered interaction product (the mediator-model equation of PROCESS Model 7). Moderated mediation was tested using the index of moderated mediation that was computed using PROCESS Model 7. The 95% bias corrected CI were obtained from 5,000 bootstrap resamples for all indirect, interaction, and conditional effects and the regression coefficient was deemed significant at  $p < .05$  if the 95% CI did not contain zero. Possible conditional indirect effects were explored at both the mean and at one standard deviation below the mean and at one standard deviation above the mean of psychological capital.

## **5. Results**

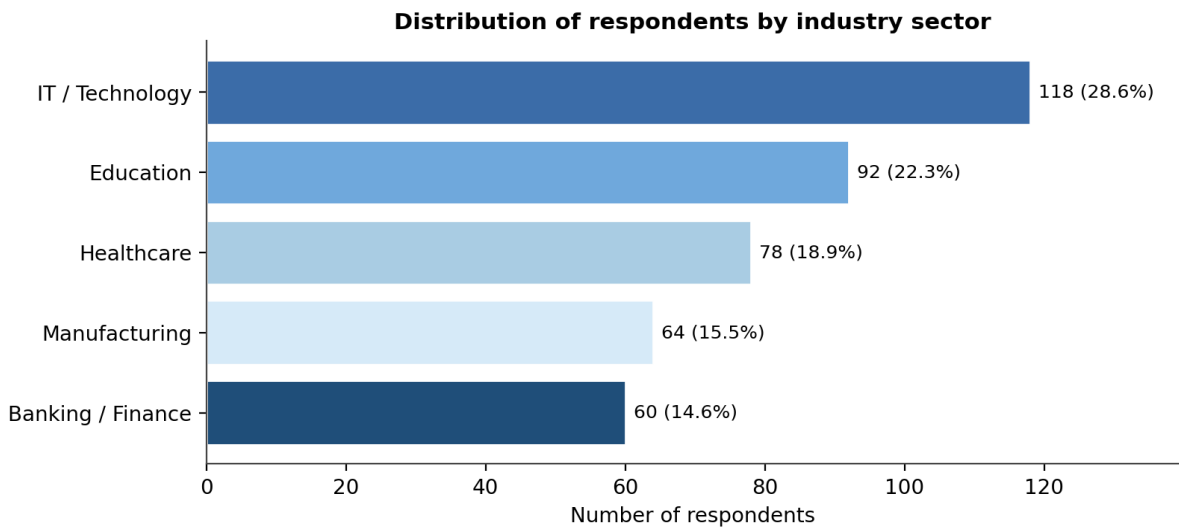
There are two parts to the results. The sample demographic profile and preliminary analyses (data screening, regression-assumption checks, common method bias evaluation, internal-consistency reliability, descriptive statistics, and zero-order correlations) are reported in Section 5.1. Each hypothesis is matched to a single and relevant statistical test, shown in SPSS format in a matrix (Section 5.2), fluently interpreted with its implication.

### ***5.1 Preliminary Analyses and Sample Profile***

The analytic sample consisted of 412 Full-time Workers. As shown in Figure 1, respondents were 55.3% female ( $n = 228$ ) and 44.7% male ( $n = 184$ ). The modal age band was 31–40 years (38.3%), followed by 21–30 (32.0%), 41–50 (20.9%), and 51 and above (8.7%). The majority of the respondents (47.6%) had a bachelor's degree while 32.0% had a master's degree; 14.1% had a diploma or below and 6.3% had a doctorate. Tenure in the organization varied as below: Less than 2 years (23.3%), 2-5 years (35.9%), 6-10 years (24.8%) and Over 10 years (16.0%). The respondents came from the information technology sector (28.6%), the education sector (22.3%), the healthcare sector (18.9%), and the manufacturing sector (15.5%) and banking and finance sector (14.6%) as shown in Figure 2.



**Figure 1.** Demographic profile of the sample (N = 412): (a) gender, (b) age group, (c) education, and (d) organizational tenure. Bars display frequencies; percentages are shown in parentheses.



**Figure 2.** Distribution of respondents across industry sectors (N = 412).

Absolute skewness values were below |2| and absolute kurtosis values below |7| for all variables, indicating no departure from univariate normality. No outlier standardized residuals, greater than |3.29|; no evidence of heteroscedasticity from the residual by predicted plots; the Durbin–Watson test statistic was within the acceptable range, indicated that the residuals for the regression models were independent. It was found that no predictor had a variance inflation factor exceeding 1.6 suggesting no problems with multicollinearity.

Results of the single-factor test were below the criterion of 50% of total variance and demonstrated that only a single unrotated factor accounted for less than 50%, thus indicating that common method bias was not a serious issue (Podsakoff et al., 2003). All composite scales showed high internal-consistency reliabilities ( $\alpha = .946$  for psychological capital, .931 for job crafting, .910 for need satisfaction and .898 for work engagement). Subscale reliabilities that exceeded the convention of .70 ranged from a .735 to .825. Table 2 presents the means, standard deviations, distributional indices, and reliabilities, while zero order Pearson correlations among the four kinds of variables measured in this study are presented in Table 3. Job crafting was significantly positively related to need satisfaction ( $r = .47, p < .001$ ), psychological capital ( $r = .25, p < .001$ ) and work engagement ( $r = .44, p < .001$ ); need satisfaction to work engagement ( $r = .61, p < .001$ ) and psychological capital ( $r = .40, p < .001$ ); and psychological capital to work engagement ( $r = .24, p < .001$ ). The overall association structure was in favor of the proposed model.

**Table 2:** *Descriptive Statistics, Distributional Indices, and Reliability of Study Variables (N = 412)*

Variable	M	SD	Skewness	Kurtosis	$\alpha$
Job crafting	3.56	0.55	-0.04	-0.40	.931
Basic psychological need satisfaction	3.64	0.48	0.20	-0.44	.910
Psychological capital	4.38	0.70	-0.32	-0.31	.946
Work engagement	4.27	0.91	-0.38	0.08	.898

*Note.* M and SD are based on composite (item-mean) scores. Job crafting and need satisfaction range 1–5; psychological capital ranges 1–6; work engagement ranges 0–6.  $\alpha$  = Cronbach's alpha.

**Table 3:** *Zero-Order Pearson Correlations Among Study Variables (N = 412)*

Variable	1	2	3	4
1. Job crafting	(.93)			
2. Need satisfaction	.47***	(.91)		
3. Psychological capital	.25***	.40***	(.95)	
4. Work engagement	.44***	.61***	.24***	(.90)

*Note.* Cronbach's alpha values appear on the diagonal in parentheses. \*\*\*  $p < .001$ .

## 5.2 Hypothesis-wise Analysis

For each hypothesis there is a section with the SPSS output of the statistical analysis of the hypothesis, and a conclusion and interpretation paragraph. Appendix Tables 4-9 have SPSS outputs in the typical three block format: Model Summary, ANOVA, and Coefficients for regression-based tests (H1- H3); the path level output for bootstrap mediation model (H4); the moderated-regression and outcome-model coefficients for PROCESS model 7 (H5); and conditional indirect effects and index of moderated mediation (H6).

**Hypothesis 1:** *Job crafting has a significant positive effect on work engagement.*

This hypothesis was tested using a simple linear regression of work engagement on job crafting. The SPSS-format output is presented in Table 4.

**Table 4:** *SPSS Regression Output for H1: Work Engagement Regressed on Job Crafting (N = 412)*

<i>Model Summary</i>						
<b>R</b>	<b>R<sup>2</sup></b>	<b>Adjusted R<sup>2</sup></b>	<b>Std. Error of the Estimate</b>			
.441	.195	.193	0.820			
<i>ANOVA</i>						
<b>Source</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>	
Regression	66.623	1	66.623	99.01	<.001	
Residual	275.872	410	0.673			
Total	342.494	411				
<i>Coefficients</i>						
<b>Predictor</b>	<b>B</b>	<b>SE</b>	<b><math>\beta</math></b>	<b>t</b>	<b>Sig.</b>	<b>95% CI for B</b>
(Constant)	1.639	0.267	—	6.13	<.001	[1.113, 2.164]
Job crafting	0.739	0.074	.441	9.95	<.001	[0.593, 0.885]

*Note.* Dependent variable: Work engagement. Predictor: Job crafting. B = unstandardized coefficient;  $\beta$  = standardized coefficient.

The regression model was significant,  $F(1, 410) = 99.01$ ,  $p < .001$ , and job crafting accounted for 19.5% of the variance in work engagement ( $R^2 = .195$ , adjusted  $R^2 = .193$ ). Job crafting positively predicted work engagement ( $B = 0.739$ ,  $SE = 0.074$ ,  $\beta = .441$ ,  $t = 9.95$ ,  $p < .001$ , 95% CI [0.593, 0.885]). Thus, the null hypothesis was rejected and the alternative hypothesis accepted. Substantively, a change of 1 point on the 5-point job-crafting scale is equivalent to a 0.74-point change on the 0–6 work-engagement scale, results that are comparable with previous cross-sectional and longitudinal studies showing links between approach-oriented job crafting and work engagement (Bakker et al., 2012; Rudolph et al., 2017). In JD-R, this finding is a reflection of the motivational process whereby resource and challenge demands that are changed by the employees

leads to increase energy and identification. Firstly, the finding recognized the precondition needed for the mediated and moderated-mediated effects explored in the following hypotheses.

**Hypothesis 2:** *Job crafting has a significant positive effect on basic psychological need satisfaction.*

This hypothesis was tested using a simple linear regression of basic psychological need satisfaction on job crafting. The SPSS-format output is presented in Table 5.

**Table 5:** *SPSS Regression Output for H2: Need Satisfaction Regressed on Job Crafting (N = 412)*

<i>Model Summary</i>						
<b>R</b>	<b>R<sup>2</sup></b>	<b>Adjusted R<sup>2</sup></b>	<b>Std. Error of the Estimate</b>			
.468	.219	.217	0.428			
<i>ANOVA</i>						
<b>Source</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>	
Regression	21.063	1	21.063	114.93	<.001	
Residual	75.143	410	0.183			
Total	96.206	411				
<i>Coefficients</i>						
<b>Predictor</b>	<b>B</b>	<b>SE</b>	<b><math>\beta</math></b>	<b>t</b>	<b>Sig.</b>	<b>95% CI for B</b>
(Constant)	2.159	0.140	—	15.47	<.001	[1.884, 2.433]
Job crafting	0.415	0.039	.468	10.72	<.001	[0.339, 0.491]

*Note.* Dependent variable: Basic psychological need satisfaction. Predictor: Job crafting. B = unstandardized coefficient;  $\beta$  = standardized coefficient.

This regression model was significant,  $F(1, 410) = 114.93, p < .001$ , and job crafting explained 21.9% of the variability in basic psychological need satisfaction ( $R^2 = .219$ , adjusted  $R^2 = .217$ ). Job crafting positively predicted need satisfaction ( $B = 0.415$ ,  $SE = 0.039$ ,  $\beta = .468$ ,  $t = 10.72$ ,  $p < .001$ , 95% CI [0.339, 0.491]). The result of the hypothesis testing showed that the null hypothesis was rejected and the alternative hypothesis was accepted. The positive and substantively meaningful a-path indicates that the process of creating craft corresponds to enhanced satisfaction of the needs in Self-Determination Theory (Deci & Ryan, 2000; Van den Broeck et al., 2010): autonomy, competence, relatedness. In theory because in creating – by the nature of creating – it is also volitional (autonomy), capability-stretching (competence) and often relationship-reshaping (relatedness). Now, as a result, the basic psychological need satisfaction is considered feasible as a motivational mediational lens and it is the inspiration for formal mediation testing in H4.

**Hypothesis 3:** *Basic psychological need satisfaction has a significant positive effect on work engagement.*

This hypothesis was tested using a multiple linear regression of work engagement on basic psychological need satisfaction, controlling for job crafting. The SPSS-format output is presented in Table 6.

**Table 6:** SPSS Regression Output for H3: Work Engagement Regressed on Need Satisfaction, Controlling for Job Crafting ( $N = 412$ )

<i>Model Summary</i>						
<b>R</b>	<b>R<sup>2</sup></b>	<b>Adjusted R<sup>2</sup></b>	<b>Std. Error of the Estimate</b>			
.635	.403	.400	0.707			
<i>ANOVA</i>						
<b>Source</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>	
Regression	138.086	2	69.043	138.15	<.001	
Residual	204.408	409	0.500			
Total	342.494	411				
<i>Coefficients</i>						
<b>Predictor</b>	<b>B</b>	<b>SE</b>	<b><math>\beta</math></b>	<b>t</b>	<b>Sig.</b>	<b>95% CI for B</b>
(Constant)	-0.466	0.290	—	-1.61	.109	[-1.036, 0.104]
Job crafting	0.334	0.072	.199	4.61	<.001	[0.191, 0.476]
Need satisfaction	0.975	0.082	.517	11.96	<.001	[0.815, 1.136]

*Note.* Dependent variable: Work engagement. Predictors: Job crafting, Basic psychological need satisfaction. B = unstandardized coefficient;  $\beta$  = standardized coefficient.

The regression model was significant,  $F(2, 409) = 138.15$ ,  $p < .001$ , and the two predictors jointly accounted for 40.3% of the variance in work engagement ( $R^2 = .403$ , adjusted  $R^2 = .400$ ). Need satisfaction positively and significantly predicted work engagement ( $B = 0.975$ ,  $SE = 0.082$ ,  $\beta = .517$ ,  $t = 11.96$ ,  $p < .001$ , 95% CI [0.815, 1.136]), while job crafting retained a significant direct effect ( $B = 0.334$ ,  $\beta = .199$ ,  $t = 4.61$ ,  $p < .001$ ). The results of the test showed that the null hypothesis was rejected and the alternative hypothesis was accepted. In the model, need satisfaction was found to be the highest univariate significant predictor of engagement, accounting for more than a twofold increase in variance compared to job crafting alone ( $R^2 = .403$  versus  $.195$  for H1). This aligns to the SDT idea that satisfying the basic needs is the most proximal motivational state, from which positive work outcomes emerge (Deci et al., 2017; Van den Broeck et al., 2016). As both the a-path (H2) and the b-path (H3) are important, the two structural preconditions for mediation are both addressed and formally tested using the bootstrap mediation analysis in H4.

**Hypothesis 4:** Basic psychological need satisfaction significantly mediates the effect of job crafting on work engagement.

This hypothesis was tested using a bootstrap mediation analysis (PROCESS Model 4) with 5,000 bias-corrected resamples and 95% bootstrap confidence intervals. The output is presented in Table 7.

**Table 7:** *Bootstrap Mediation of Job Crafting on Work Engagement Through Need Satisfaction (PROCESS Model 4; N = 412, 5,000 resamples)*

Path / effect	Coeff.	SE	t / Boot	95% CI
a: Job crafting → Need satisfaction	0.415	0.039	10.72***	[0.339, 0.491]
b: Need satisfaction → Engagement	0.975	0.082	11.96***	[0.815, 1.136]
c': Direct (Job crafting → Engagement)	0.334	0.072	4.61***	[0.191, 0.476]
c: Total (Job crafting → Engagement)	0.739	0.074	9.95***	[0.593, 0.885]
a × b: Indirect effect	0.405	0.049	—	[0.316, 0.508]

*Note.* Unstandardized coefficients. The indirect effect and its 95% bias-corrected confidence interval are based on 5,000 bootstrap resamples; "Boot" denotes the bootstrap standard error for the indirect effect. \*\*\*  $p < .001$ .

The bootstrapped indirect path function of job crafting on work engagement through need satisfaction was positive and significant,  $a \times b = 0.405$ ,  $\text{BootSE} = 0.049$ , 95% bootstrap CI [0.316, 0.508]. The null hypothesis was rejected and the alternative hypothesis accepted since the confidence interval did not contain 0. The direct effect was still significant ( $c' = 0.334$ ,  $p < .001$ ) which means that need satisfaction mediated about 55% of the total effect of job crafting on engagement ( $0.405 / 0.739$ ). Empirically put, basic psychological need satisfaction is the strongest (but not exclusive) pathway to and from crafting behavior that leads to engagement. This incorporates the behavioral facet of JD-R theory and the experience facet of SDT (Bakker & Demerouti, 2007; Van den Broeck et al., 2016) and suggests there are probably other mechanisms that activate in parallel (e.g., an affective spillover, person-job fit and experience of meaningfulness).

**Hypothesis 5:** *Psychological capital significantly moderates the effect of job crafting on basic psychological need satisfaction.*

Using multiple regression, need satisfaction was regressed on the mean-centered job crafting, the mean-centered psychological capital and the product term of mean-centered job crafting and psychological capital (as the mediator-equation in PROCESS Model 7). The results are presented in Table 8.

**Table 8:** Moderated-Regression Output for the Mediator and Outcome Equations of PROCESS Model 7 (N = 412)

Predictor	B	SE	t	p	95% CI
<b>Mediator equation (DV: Need satisfaction);</b> <b>R<sup>2</sup> = .337, F(3, 408) = 69.09, p &lt; .001</b>					
Constant	3.615	0.020	180.04	<.001	[3.576, 3.655]
Job crafting (a <sub>1</sub> )	0.340	0.037	9.19	<.001	[0.267, 0.413]
Psychological capital (a <sub>2</sub> )	0.223	0.029	7.73	<.001	[0.166, 0.280]
Job crafting × PsyCap (a <sub>3</sub> )	0.227	0.051	4.48	<.001	[0.128, 0.326]
<b>Outcome equation (DV: Work engagement);</b> <b>R<sup>2</sup> = .403, F(2, 409) = 138.15, p &lt; .001</b>					
Constant	0.721	0.299	2.42	.016	[0.134, 1.309]
Job crafting (c')	0.334	0.072	4.61	<.001	[0.192, 0.476]
Need satisfaction (b)	0.975	0.082	11.96	<.001	[0.815, 1.136]

*Note.* Unstandardized coefficients. Job crafting and psychological capital were mean-centered prior to computing the product term. DV = dependent variable.

The mediator equation was significant,  $F(3, 408) = 69.09, p < .001, R^2 = .337$ . Job crafting ( $a_1 = 0.340, p < .001$ ) and psychological capital ( $a_2 = 0.223, p < .001$ ) each independently predicted need satisfaction, and critically the job crafting × psychological capital interaction was significant ( $a_3 = 0.227, SE = 0.051, t = 4.48, p < .001, 95\% CI [0.128, 0.326]$ ), accounting for a significant increment in explained variance ( $\Delta R^2 = .031, p < .001$ ). The null hypothesis was refuted and therefore the alternative hypothesis was accepted. This positive interaction coefficient means that the strength of the relationship between job crafting and psychological need satisfaction grows stronger as employee's psychological capital (either as a whole or in its separate components) becomes larger: the stronger the psychological capital component, the stronger the relationship between job crafting and the perceived psychological needs satisfaction is. This is compatible with the gain-spiral mechanism proposed by Conservation of Resources theory (Hobfoll, 2002) as well as the broaden-and-build explanation (Fredrickson, 2001) which hold that an increase in personal psychological resources in the context of large amounts of resources allows people to respond to motivational opportunities that increase their resources even more. This suggests that using PsyCap as a moderator at the first stage rather than the second would be more likely to impact the conversion of behaviour to experience - as opposed to experience to engagement.

**Hypothesis 6:** *The indirect effect of job crafting on work engagement through basic psychological need satisfaction is significantly conditional on psychological capital.*

The index of moderated mediation (Hayes, 2015) was calculated using 5,000 bias corrected bootstrap resamples and 95% confidence intervals to test this hypothesis using the PROCESS Model 7. For a conditional indirect effect, we examined the mean, as well as the lower and upper

extremes of one standard deviation below and above the mean of psychological capital. The results are shown in Table 9.

**Table 9:** *Conditional Indirect Effects of Job Crafting on Work Engagement and Index of Moderated Mediation (N = 412, 5,000 resamples)*

Level of psychological capital	Indirect effect	Boot SE	95% bootstrap CI
Low (-1 SD)	0.176	0.056	[0.073, 0.294]
Mean	0.332	0.044	[0.251, 0.427]
High (+1 SD)	0.487	0.056	[0.382, 0.603]
<b>Index of moderated mediation</b>	<b>0.221</b>	<b>0.048</b>	<b>[0.127, 0.315]</b>

*Note.* Conditional indirect effects and the index of moderated mediation are based on 5,000 bias-corrected bootstrap resamples. SD of psychological capital = 0.70. A confidence interval excluding zero indicates a significant effect.

The index of moderated mediation was significant, index = 0.221, BootSE = 0.048, 95% bootstrap CI [0.127, 0.315]. The 95% confidence interval did not contain zero so this meant that the null hypothesis was not supported and the alternative hypothesis was. Results revealed that the conditional indirect effects of job crafting on work engagement through need satisfaction increased monotonically at all three levels of psychological capital (low: 0.176, 95% CI [0.073, 0.294]; mean: 0.332, 95% CI [0.251, 0.427]; high: 0.487, 95% CI [0.382, 0.603]), such that each bootstrap 95% CI did not contain zero. There was an indirect effect at high psychological capital that was around 2.8 times larger than at low psychological capital. Importantly, the indirect effect was significant at low personal resources (psychological capital), indicating that the motivational benefit of crafting applies regardless of a person's personal resources; the benefit in terms of low or high personal resources (psychological capital) is adjusting the size of the benefit, and not just that it is present or absent. This conditional pattern nests the behavioral, experiential and personal-resource explanations of work motivation as a unified and empirically based model and offers direct inferential evidence (not only from the significant interaction score) that the indirect pathway reliant on a developable personal resource is also a function of that personal resource (Hayes, 2015; Preacher et al., 2007).

## 6. Discussion

While Section 5 presented a more discrete interpretation of each hypothesis, as the product of an individual test, the present section presents a single interpretation, theoretical and practical, of the six results. The results were coherent and showed that job crafting was positively associated with work engagement, satisfaction with basic psychological needs mediated this relationship, and psychological capital significantly moderated the first pathway in the indirect relationship with work engagement, meaning the indirect relationship with work engagement was stronger when psychological capital was higher. The normalized moderated mediation index was a significant

finding, showing that the increase in the crafting-to-engagement mechanism depends on personal resource.

### ***6.1 Theoretical Implications***

First, by mediating the establishment of the basic psychological need satisfaction, the intrapsychic mechanism that JD-R theory leaves implicit is specified. JD-R offers explanation as to how crafting affects the resources and demands, and SDT offers explanation as to why it affects them motivationally: because they help satisfy the needs for autonomy, competence, and relatedness. Complementary mediation in H4 indicated that need satisfaction is one but not the only path in line with the idea that the JD-R motivational process is a multi-mechanism process (Bakker & Demerouti, 2007; Van den Broeck et al., 2016). Some other plausible additional mechanisms are affective spillover from positive crafting experiences, salience of work-related goals through identity work, and reduction of objective workload which releases cognitive capacity for the complete absorption of the task.

Secondly, the moderating effect of psychological capital in H5 and H6 nurtures the field of a resource-based argument by demonstrating an interaction between personal resources and behavioral resources. More than a replacement for crafting, psychological capital enhances the motivational returns of crafting. This is in full line with the gain-spiral principle of Conservation of Resources theory (Hobfoll, 2002) and with the broaden-and-build account (Fredrickson, 2001). The moderation point at stage one (not the second) is theoretically significant: (after) meeting of needs seems to drive equal levels of engagement, regardless of individual differences in personal resources – that is, the motivational engine of need satisfaction is a powerful one.

Third, the application of the formal presentation of moderated mediation using the method advocated by Hayes (2015) is done, rather than merely using the significant interaction as evidence for moderated mediation (Preacher et al., 2007). The conditional indirect effect (going from the low PsyCap to the high PsyCap of 0.176 to 0.487) is substantively significant, because together with the high PsyCap, the engagement benefit of crafting is about 2.8 times as significant as at the low PsyCap, which is large enough to be practically important in occupational settings.

Finally, in blending a JD-R behavior (crafting), an SDT mediator (need satisfaction), and a positive-organizational-behavior moderator (PsyCap), the model illustrates the merits of theoretical pluralism. Both frameworks add unique explanatory information, with JD-R identifying the behavior, SDT identifying the experience, and the positive-organizational-behavior literature identifying the personal resource that influences the experience.

### ***6.2 Practical Implications***

The results indicate that interventions which involve job crafting and psychological-capital development are additive, not redundant, for practice. As the engagement benefits were greatest for high-PsyCap employees, pairing crafting training with PsyCapbuilding micro interventions, developed in prior research with short and structured exercises (Luthans & Youssef-Morgan,

2017), may yield the greatest returns in the organization. Managers can also redesign roles to provide true crafting latitude discretion in task, opportunities for feedback, challenge, and social resources – and to encourage and support employees to focus their proactivity for need satisfaction. In fact, H6 reveals that the indirect effect is still significant at low values of psychological capital, implying that crafting is good irrespective of the amount of psychological capital it just means it is more or less good, depending. Targeted crafting programs yield higher benefits in terms of gaining PsyCap, and this is a reassuring message for organization that are considering using universal crafting programs: the higher the levels of PsyCap, the greater the benefits of crafting, and crafting helps increase PsyCap.

Leaders can focus at the supervisory level on the language that is used when talking to staff about opportunity building. Crafting is an answer to the question "what do you need to do?" and autonomy-supportive language (as opposed to controlling language) fits this nicely ("Here is the latitude you have; how would you like to use it?"). To support the model at the organisational level, HR systems can either reward behaviours around crafting in performance reviews or create development opportunities for growing the capacities of employees, and ensure that workloads allow for the bandwidth to engage in proactive role redesign.

### ***6.3 Limitations and Future Research***

A number of restrictions qualify these conclusions. Firstly, the cross-sectional and single source nature of the study is incapable of drawing inferences about causation, and there is a possibility of reverse causality or reciprocity between engaged employees and crafting, which may result in more engaged employees being more likely to craft and vice versa. Common method bias was not problematic based on the Harman's test that was conducted, but longitudinal and multi-source designs would be necessary to establish temporal precedence. Diary or experience-sampling designs would be of particular interest for being able to capture the dynamic, episode-level processes whereby crafting episodes meet needs, which in turn fuel more crafting.

Second, the moderated-mediation model was a theory-driven and first stage in form model; future studies should examine other models (e.g., second / dual stage moderation, PROCESS Models 14 and 58) and compare them to direct-path moderation models where the role of psychological capital is to moderate the direct pathway. Third, the four crafting dimensions were lumped together; but a dimension-specific moderated-mediation analysis would be able to present a clearer picture, as approach and avoidance dimensions of crafting relate differently to the outcomes (Lichtenthaler & Fischbach, 2019). Fourth, the current sample, though diverse with respect to sectors, happened to be one national context only, thus limiting the extrapolability of the results. Replication across cultures is desirable since the processes of crafting and need satisfaction might differ between individualist and collectivist cultures of work. Finally, the present specification of moderated mediation gives a powerful summary of the mediation, but it is a linear summary. Johnson–Neyman regions of significance would identify the range of psychological capital across which the conditional indirect effect is statistically significant, whereas polynomial moderation

terms would be required to test for non-linear moderation patterns, which the present linear specification leaves undetected.

## 7. Conclusion

The results of this study provide support for the significant relationship between job crafting and work engagement via the satisfaction of the three psychological needs and for the moderation of psychological capital in the first step of this relationship. The results explain both the mechanism (need satisfaction) and one of the underlying boundary conditions (psychological capital) in JDs' relationship with work engagement, showing how these relate to SDT in a conditional process perspective. The substantial moderated mediation index approximately (2.77 times greater when psychological capital is high compared to when it is low) equates to practically noticeable differences in employee energy, identification and absorption that can cumulate over time to form relevant organizational outcomes. A simple, evidence-based pathway to maintaining engagement in today's work is to develop employees' proactivity (self-driven crafting) and psychological capital simultaneously.

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