



Impacts of psychological contract fulfillment on work attitudes and behaviors during the COVID-19 pandemic: mediating role of perceived organizational support

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Abstract

The paradigm shifts in HRM during the outbreak of COVID-19 involve new challenges for organizations, whereas it remains unclear how psychological contract fulfillment works on employees' attitudes and behaviors in the new working settings from organizations. This paper explores the impacts of psychological contract fulfillment on employees' work attitudes and behaviors (work engagement, intrinsic motivation, and affective commitment) during the COVID-19 outbreak, and examines the mediating mechanism of perceived organizational support between psychological contract fulfillment and these work-related variables. For the research, a cross-sectional research design and quantitative analysis were adopted. Data were collected via survey questionnaires and from 405 respondents working remotely during the COVID-19 outbreak. The findings revealed that psychological contract fulfillment positively impacted employees' work engagement, intrinsic motivation, and affective commitment during the COVID-19 outbreak, and indicated that perceived organizational support significantly but partially mediates the positive associations between PCF and these work-related variables.

Keywords Psychological contract fulfillment · Work engagement · Intrinsic motivation · Affective commitment · Perceived organizational support · COVID-19

Introduction

For decades, research on psychological contracts has obtained widespread academic attention, as it provides a unique framework to understand work-related outcomes and changes in the employment relationship. Psychological contract, rooted in social exchange theory (SET), refers to individuals' perceptions that concern the mutual obligations and responsibilities between employees and employers (Rousseau, 1995). Previous research into psychological contracts has mainly been conducted on their breach and consequences in the organization-employee relationship, while the positive side, particularly psychological contract fulfillment (PCF), has obtained limited attention (Ahmad & Zafar, 2018; Rayton et al., 2015). Conway et al. (2011)

proposed that PCF is an essential determinant of attitudinal and behavioral outcomes of employees, such as work engagement (Agarwal, 2014; Bal et al., 2013; Kim et al., 2020; Soares & Mosquera, 2019), organizational commitment (Ababneh, 2020; Ahmad et al., 2018; Birtch et al., 2016; Fontinha et al., 2014), job satisfaction, etc. (Karani et al., 2021; Pohl et al., 2016).

Organizational support theory (OST) is believed as another theoretical underpinning explaining the potential mechanism of PCF on employees' attitudes and behavior (Ahmad & Zafar, 2018; Zagenczyk et al., 2011). As earlier pointed out, SET mainly captures behavioral responses while overlooking the symbolic nature of exchange in employment relationship (Fuller et al., 2006; Restubog et al., 2008). Thus, taking OST as another theoretical framework helps to capture the employee-employer relationship from the symbolic perspective (Ahmad & Zafar, 2018; Zagenczyk et al., 2011). According to OST, employees generate a degree of psychological perceptions regarding the extent of organizational support, termed perceived organizational support (POS). Therefore, the current research studies the

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impacts of PCF on employees' attitudes and behaviors and the mediation effect of POS by combining OST and SET as theoretical underpinnings.

Furthermore, given the peculiarities of Chinese regular epidemic prevention and control measures, this study took China as a case study. In particular, China has implemented strict home confinement measures to contain the outbreak. Many organizations, accordingly, implemented work remotely in this situation. Thus, organizations' working situations and patterns have undergone significant changes during the outbreak of COVID-19. The employment relationships in that time have also undergone more significant changes. Although empirical evidence has suggested a strong link between PCF and employees' work attitudes and behavior (Lo & Aryee, 2003; Turnley et al., 2003), it remains unclear how PCF works on employees' attitudes and behavior from the new working settings from organizations (Karani et al., 2021). Considering the paradigm shift in organizational HRM during the outbreak of COVID-19, this "change" of organizations, therefore, endows the employees with more significant psychological contract characteristics. Psychological contracts and their fulfillment have become progressively essential in explaining the present organization-employee relationships. Therefore, the study of the PCF during this era is needed theoretically and practically.

This research attempts to study the relationships among PCF and employees' attitudes and behaviors during the COVID-19 pandemic. Although extensive research has studied PCF in relation to working-related variables, such as engagement, commitment, job satisfaction, etc., this paper is the first to research PCF, work engagement, intrinsic motivation, affective commitment, and POS in one study. Furthermore, employees' expectations are changing as new paradigms of HRM are being adapted during the pandemic. Understanding changes in the employment relationship, thus, is being considered as a probable path to deal with the challenges ahead. Thirdly, the research provides a novel lens to study the underlying organization-employee relationship, as the majority of past research studied psychological contracts within organizations on breach and consequences in the employment relationship, with limited academic attention focused on the positive side of PCF. Fourthly, a considerable part of the existing psychological contract studies carries out using Western samples, with a consequent dearth of studies in non-Western contexts. In this regard, this research therefore might generalize the findings of the psychological contract literature, and shine some light on the nature of psychological contracts developed from a different cultural context.

Theatrical background

Within an organization, employers and employees always exist in a bilateral exchange relationship, this paper is theoretically underpinned by SET (Blau, 1964). Rousseau and Tijoriwala (1998) defined the term "psychological contract" as the perceptions of employees that concerns the mutual obligations and responsibilities existing between themselves and the organization, emphasizing a bilateral exchange relationship (Karani et al., 2021). SET provides a framework using psychological contracts to study the reciprocal exchange existing in employment relationships, and to understand how employees are likely to respond in accordance with their PCF (Turnley et al., 2003). Researchers pointed out that a positive fulfillment of psychological contracts emerges when employees perceived more than their organizations promised or needed to fulfill. This, then, strengthens the exchange relationship within organizations, driving employees to improve their work-related attitudes and behavior. If the psychological contract established between the two is not fulfilled, then a psychological contract breach occurs, pushing employees to adjust contributions to re-balance the relationship between the two parties (Rousseau, 1995).

In SET, psychological contracts have two types of exchange relationships existing in employment relationships, namely economic exchange and social exchange (Loi et al., 2009). Compared with economic exchange, social exchange focuses on maintaining a high level of emotional and interpersonal relationships, which means that it tends to produce stronger feelings of reciprocity, gratitude and trust in employees (Shore et al., 2009). However, given the new situation COVID-19 poses, it is not clear how psychological contracts change under a paradigm shift of Human Resource Management, how the content, depth, and breadth of these contracts shifted, and how these shifts affect employees' work attitudes and behaviors. Thus, the consideration of PCF, whose nature and quality are embedded in employment relationships, logically points to SET.

OST also helps to capture the fundamental mechanism by which PCF impacts work attitudes and behaviors (Ase-lage & Eisenberger, 2003; Blau, 1964) proposed that the care, esteem, and admiration perspectives of the psychological contracts are well supported by OST. OST suggests that employees generate a degree of psychological perception regarding the extent of organizational support, referred to as perceived organizational support (POS). In OST, employees transact efforts at work to organizations for social-emotional and instrumental support according to the reciprocity norm (Eisenberger et al., 1986; Rhoades & Eisenberger, 2002). Thus, OST is considered as an application of SET to the employment relationship within organizations (Baran

et al., 2012). Meanwhile, OST supports SET to capture the underlying mechanisms of PCF on work-related variables. As studies suggested that SET is mainly set surround the instrumental perspective of psychological contracts (Ase-lage & Eisenberger, 2003), capturing behavioral responses (Fuller et al., 2006; Restubog et al., 2008), while OST captures symbolic perspectives in an employment relationship (Ahmad & Zafar, 2018; Zagenczyk et al., 2011), covering the socio-emotional side of such a relationship. Therefore, both SET and OST play roles in shaping the underlying mechanisms of PCF on employees' attitudes and behaviors.

Hypothesis development

PCF and work engagement

The explanation that PCF is an essential determinant of attitudinal and behavioral outcomes of employees is based on SET (Blau, 1964). Under SET, employees engage in interactions with the organization when their expectations are fulfilled. This means that employees will increase the level of work engagement as a means of reciprocating when their expectations are met in the workplace (Rayton & Yalabik, 2014; Kahn, 1990) first defined “engagement” within an organizational context. Subsequently, work engagement was defined as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli et al., 2002), emphasizing the input of employees in the reciprocal exchange within organizations. In the existing literature, the inherent connection between PCF and work engagement has been explored in limited research, which have consistently pointed out that PCF is an essential determinant of work engagement (Agarwal, 2014; Bal et al., 2013; Kim et al., 2020; Soares & Mosquera, 2019; Karani et al., 2021) confirmed that work engagement acts as a mediator between PCF and work-related variables during the COVID-19 outbreak in a cross-sectional analysis. So far, however, no study has shown the direct relation between PCF and work engagement in COVID-19 pandemic settings. Given the rule of SET involving reciprocity, PCF allows employees to immerse more cognitive, emotional, and physical resources in their roles at work. Therefore, this paper proposes that PCF positively impacted work engagement during the COVID-19 outbreak.

H1. PCF is positively related to work engagement during the COVID-19 outbreak.

PCF and intrinsic motivation

Work motivation is defined as forces that excite proactive behaviors related to high work performance and account

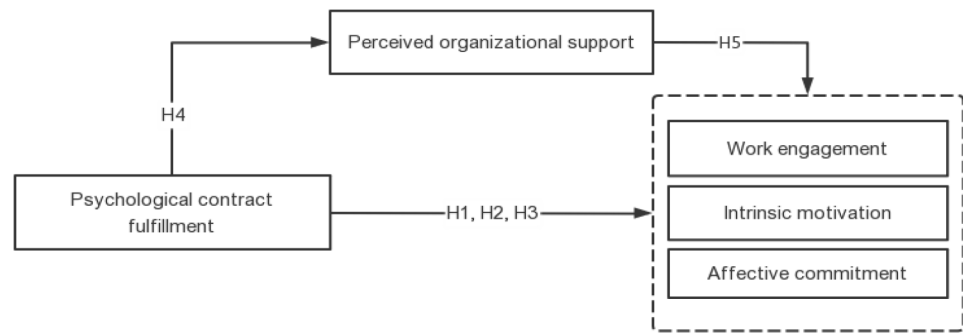
for the form, direction, intensity, and persistence of these proactive behaviors (Pinder, 1998). In the existing research, the mainstream research divides employees' motivation into intrinsic motivation and extrinsic motivation. Different from extrinsic motivation that originates from incentives outside of work such as rewards, promotions, and increased wages, intrinsic motivation arises from within an individual and captures individuals' psychological needs (Ryan & Deci, 2000). Intrinsic motivation can then be regarded as a way of reciprocation to PCF by the employees. Hence, this research mainly focuses on intrinsic motivation. Although as an important attitude outcome of PCF, intrinsic motivation has received limited academic attention from psychological contract studies. De Lange et al. (2011) conducted longitudinal research and proved that psychological contract breach negatively affected employees' intrinsic motivation, and found that future time perspective moderated the associations. However, to date, no study has looked at the intrinsic motivation of employees as an outcome variable related to PCF. Here, this research assumed that PCF positively impacts employees' intrinsic motivation.

H2. PCF is positively related to intrinsic motivation during the COVID-19 outbreak.

PCF and affective commitment

Employees will increase commitment to the organization as a possible path of reciprocation to fulfillment of psychological contracts (Coyle-Shapiro & Kessler, 2000). Organizational commitment refers to a psychological state formed from affective commitment, normative commitment, and continuance commitment, which reflects a desire, need, and sense of obligation to keep their organizational membership (Meyer & Allen, 1991). Given that employees are prone to generate a stronger attitudinal attachment to organizations who have delivered their contracts (Tekleab & Chiaburu, 2011). Affective commitment is also termed “attitudinal commitment” (Iverson & Buttigieg, 1999), as it is more consistent with the notion of attitudes. Thus, this research mainly focuses on affective commitment. Several existing research has examined the association between PCF and organizational commitment and has consistently provided considerable support for the positive association of PCF with organizational commitment (Ababneh, 2020; Conway et al., 2011; Coyle-Shapiro & Kessler, 2000; Karani et al., 2021; Mensah, 2019; Parzefall, 2008; Pohl et al., 2016). In particular, Coyle-Shapiro and Kessler (2000) stated that employees re-balance the employment relationship by increasing affective commitment to their organization when PCF occurs. Given the previous studies, this research proposes that the greater the PCF, the greater the affective commitment.

Fig. 1 Proposed hypothesized framework



H3. PCF is positively related to affective commitment during the COVID-19 outbreak.

Mediating role of POS

POS refers to a degree of psychological perception of employees for the support and helps from their organizations (Eisenberger et al., 1986), and it has been found to have important consequences on work-related variables. According to OST, well support from organizations will increase the level of PCF of employees, increasing the norms of reciprocity, then employees reciprocate similar behavior to balance the employment relationship (Eisenberger et al., 2001). Previous studies have largely pointed to positive significant relations between PCF and working-related variables (Bal et al., 2013; Conway et al., 2011; Parzefall, 2008; Pohl et al., 2016; Turnley et al., 2003), and between PCF and POS (Coyle-Shapiro & Conway, 2005; Lee et al., 2000). Nevertheless, scarce research observed the mediation effect of POS. For instance, the mediating mechanism of POS between PCF and organizational citizenship behavior was validated (Ahmad & Zafar, 2018), while the empirical study failed to confirm the mediation effect of POS between PCF and organizational commitment (Pohl et al., 2016). In light of the above arguments, this paper proposes that PCF is a predictor of POS and explores that the underlying mediating mechanism between PCF and work-related variables (work engagement, intrinsic motivation, and affective commitment). Figure 1 portrays the overall model.

H4. PCF is positively related to POS during the COVID-19 outbreak.

H5. POS mediates the relationship between PCF and work attitudes and behaviors.

Method

Data collection and procedures

As respondents could not be reached in person during the lockdown, the questionnaire was used as a data-gathering technique and was administered through websites. As the measurement scales were in English and yet the context of the research is China, the original measurement scales were translated to Chinese in questionnaires. To ensure that the meaning remains the same as its original English version, the Chinese version of the questionnaires went through a multi-step review and editing process by a professional translation agency. The sampling strategy in this methodology involves snowball sampling to reach target respondents who worked remotely during the COVID-19 outbreak. The respondents come from public and private sector organizations in China. They were neither from the same hierarchy level nor have a similar demographic profile. A total of 443 out of a total of 500 questionnaires were received, out of which 405 were valid to use as data in the research, forming a response rate of 81%. The obtained data were analysed via the SPSS version 23 and the AMOS 23.

In the sample set, 47.4% are men and 52.6% are women. As for the distribution of the respondents' age, 39.3% are 18 to 30 years, 44.5% are 31 to 40 years, 13.8% are 41 to 50 years, and 2.4% were 51 years old or above. Regarding employee education levels, 60.3% hold bachelor's degrees, and 13.8% hold post-graduate or higher degrees. Among the respondents, 35% have 1–5 years of work experience, 37.7% have 6–10 years of work experience, 21% have 11–15 years of work experience, and 6.3% have 16 years or above work experience. Employees represented diverse functional backgrounds, 29.1% of respondents are from management positions, 29.8% of respondents are from professional positions, 19.2% of respondents from marketing positions, 16.5% of respondents from technical positions, and 5.4% of respondents from operational positions.

Table 1 Results of reliability and validity

Items	SFL	Alpha (a)	KMO	CR	AVE
PCF		0.890	0.817	0.890	0.670
PCF 1	0.813				
PCF 2	0.818				
PCF 3	0.799				
PCF 4	0.844				
WE		0.896	0.885	0.896	0.632
WE 1	0.770				
WE 2	0.819				
WE 3	0.818				
WE 4	0.779				
WE 5	0.786				
IM		0.852	0.801	0.851	0.588
IM 1	0.805				
IM 2	0.723				
IM 3	0.770				
IM 4	0.768				
AC		0.904	0.888	0.903	0.651
AC 1	0.814				
AC 2	0.811				
AC 3	0.822				
AC 4	0.809				
AC 5	0.783				
POS		0.878	0.831	0.878	0.642
POS 1	0.764				
POS 2	0.830				
POS 3	0.812				
POS 4	0.800				

Notes: WE = work engagement; IM = intrinsic motivation; AC = affective commitment

Measurement scales

To ensure the construct has good internal consistency, all variables were assessed using multi-item scales cited from previous research and were measured via 5-point Likert scales from 1 (strongly disagree) to 5 (strongly agree). In particular, a four-item scale adopted from Robinson and Morrison (2000) was presented to measure the PCF of respondents. Five items cited from the simplified version of the Utrecht Work Engagement Scale (UWES) (Schaufeli & Bakker, 2003) were used to assess respondents’ work engagement. As for intrinsic motivation, four items selected from Work Preference Inventory (WPI) scale (Amabile et al., 1994) were applied. Afterwards, we assess respondents’

affective commitment with five items extracted from Allen and Meyer (1990). Finally, we used a four-item scale extracted from the Survey of Perceived Organizational Support (Eisenberger et al., 1986) to measure POS.

Analyze and results

Reliability and validity

To verify the reliability of the scales selected in this paper, a coefficient and combined reliability (CR) were calculated (see Table 1). Results show that the values of a coefficient and CR for all scales are higher than 0.7, indicating that the reliability of the scales selected in this paper has good internal consistency. Furthermore, we determined the structural validity of research variables by the confirmatory factor analysis (CFA). The values reported for standard factor loading (SFL) are above 0.7 and for average variance extracted (AVE) are above 0.5, indicating that the constructs of this research have good discriminant and convergent validity. In addition, the requirement of validity of the data is also met by detecting Kaiser Meyer-Olkin (KMO) and Bartlett’s test for Sphericity. Furthermore, the problem of multicollinearity is not present in the research, since the maximum VIF value is 3.428 that less than 5.

Common method variance assessment

To achieve that the hypothesized relationships among the variables used for this research could be free from common method variance (CMV) influence, Harman’s one-factor method was applied. The result shows that 37.78% of the difference was accounted for by a single factor, indicating that CMV is not present. In addition, a Chi-square value of 1351.924 at $p < 0.001$ was detected for a single latent factor, which was considerably worse than that of 308.798 at $p < 0.001$ for a five-factor mode. Therefore, this study is free from problems concerning CMV.

Descriptive statistics and correlations

According to Table 2, which summarized means, standard deviations (SD), and correlations among the variables used

Table 2 Means, standard deviations, and correlations among the variables

No.		Means	SD	1	2	3	4	5
1	PCF	3.738	0.418	-				
2	Work engagement	3.665	0.375	0.432**	-			
3	Intrinsic motivation	3.861	0.434	0.413**	0.365**	-		
4	Affective commitment	3.541	0.371	0.415**	0.250**	0.224**	-	
5	POS	3.905	0.499	0.467**	0.381**	0.534**	0.176**	-

Notes: N = 405; * $p < 0.05$; ** $p < 0.01$

Table 3 Fitting indicators for structural equation models

χ^2	df	χ^2/df	GFI	RMSEA	RMR	CFI	NFI	NNFI
-	-	< 3	> 0.9	< 0.10	< 0.05	> 0.9	> 0.9	> 0.9
308.798	202	1.529	0.911	0.042	0.032	0.960	0.893	0.943

Fig. 2 Measurement model.

Notes: WE = work engagement; IM = intrinsic motivation; AC = affective commitment

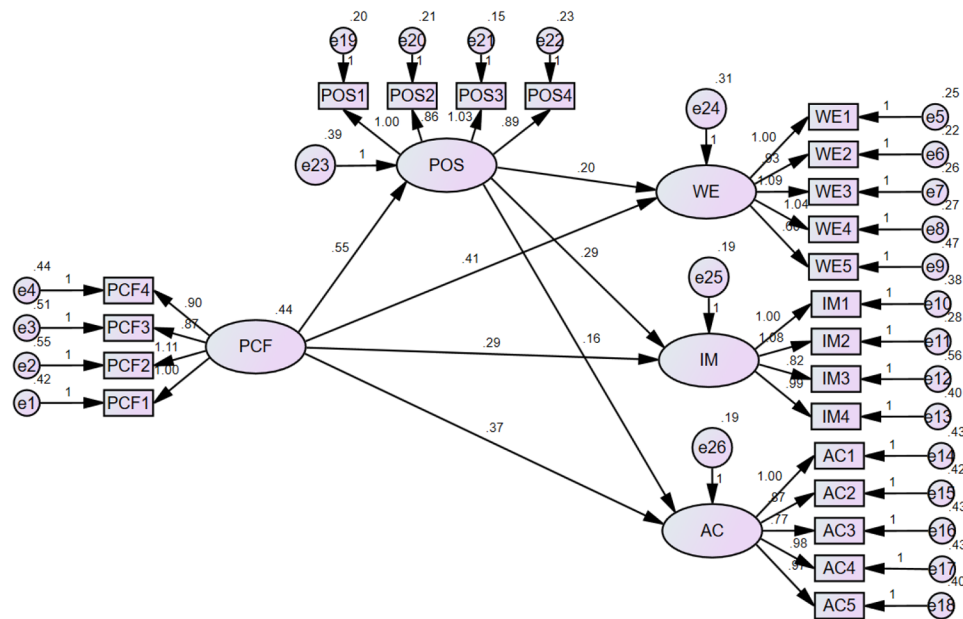


Table 4 Results of measurement of structural model

Hypotheses	Effect path	Estimate (β)	S.E.	C.R.	P	Result
H1	PCF → WE	0.413	0.081	5.112	**	Support
H2	PCF → IM	0.291	0.071	4.124	**	Support
H3	PCF → AC	0.365	0.075	4.846	**	Support
H4	PCF → POS	0.549	0.079	6.966	**	Support

Notes: N = 405; *p < 0.05; **p < 0.01

for the research, all correlations among the studied variables are positive and significant. In particular, PCF positively impacted work engagement ($r = 0.432$, $p < 0.01$), intrinsic motivation ($r = 0.413$, $p < 0.01$), affective commitment ($r = 0.415$, $p < 0.01$), POS ($r = 0.467$, $p < 0.01$).

Results of hypotheses

This study took structural equation modeling (SEM) as the tool to validate the goodness of fit of the proposed model. The main fitting indicators extracted from the structural model test are detailed in Table 3. After comparison with the given recommended value of the adaptation index, the fitted values of the other adaptation indexes fall within except that the NFI value is very close to the suggested value of 0.9. Hence, the setting of this theoretical model is acceptable.

The measurement of structural model is illustrated in Fig. 2 and the results of measurement of structural model are presented in Table 4. As assumed, PCF contributes to employees’ work attitudes and behaviors during the

COVID-19 outbreak. In particular, the results support H1 that PCF positively impacts work engagement ($\beta = 0.41$, $p < 0.01$). Similarly, the positive relationship between PCF and intrinsic motivation is proved ($\beta = 0.29$, $p < 0.01$), which supports H2. PCF also exhibits a significantly positive effect on affective commitment ($\beta = 0.37$, $p < 0.01$), suggesting that H3 is also supported. Furthermore, the results also prove that H4 suggested a positive relation between PCF on POS ($\beta = 0.55$, $p < 0.01$).

To further explore the mediation effect of POS, this study used the bootstrapping process suggested by Preacher and Hayes (2008) to repeatedly sample 2000 times to observe the mediation effect of POS in the model. Generally, the mediation effects are seen as significant if the 95% confidence bootstrap estimates interval excludes zero (Zhao et al., 2010). As presented in Table 5, the point estimate for the indirect effect of PCF-POS-WE is 0.106 ($p < 0.01$), with a confidence interval of 0.024–0.206, the point estimate for the indirect effect of PCF-POS-IM is 0.191 ($p < 0.01$), with a confidence interval of 0.105–0.294, and the point estimate

Table 5 Mediation Path test results

Mediation Path	Indirect effect coefficient	Bootstrapping			
		Bias-corrected		Percentile	
		Lower	Upper	Lower	Upper
PCF-POS-WE	0.106**	0.024	0.206	0.016	0.198
PCF-POS-IM	0.191**	0.105	0.294	0.105	0.292
PCF-POS-AC	0.107**	0.036	0.197	0.030	0.187

Notes: WE = work engagement; IM = intrinsic motivation; AC = affective commitment. * $p < 0.05$; ** $p < 0.01$

for the indirect effect of PCF-POS-IM is 0.107 ($p < 0.01$), with a confidence interval of 0.036–0.197. Therefore, the results support H5 that POS mediates the relationships between PCF and work engagement, intrinsic motivation, and affective commitment.

Conclusion

General findings

The uncertainty caused by the COVID-19 epidemic has presented complicated issues to organizations all around the world. Given the strict home confinement measures of China, many Chinese businesses are obliged to reorganize their operations and implement work remotely, leading the paradigm of organizational HRM to undergo several significant changes. It is yet unknown, though, how these extraordinary circumstances affect the work-related attitudes and behaviors of employees who work from home. For this purpose, underpinned by SET and OST, this research intends to explore the effects of PCF on work engagement, intrinsic motivation, and affective commitment, and the mediating mechanism of POS between PCF and work attitudes and behaviors during the COVID-19 pandemic. The proposed conceptual framework, overall, is largely supported. The results reveal that PCF of employees who are forced to work remotely because of the COVID-19 outbreak has a significant direct impact on their work engagement (Agarwal, 2014; Bal et al., 2013) and affective commitment (Coyle-Shapiro & Kessler, 2000). And the findings confirm the positive correlation between PCF and employees' intrinsic motivation for the first time. In addition, the results also confirm that POS is an outcome variable concerning PCF (Coyle-Shapiro & Conway, 2005; Lee et al., 2000), and suggest that POS partially mediates the positive relationship between PCF and work attitudes and behaviors (Ahmad & Zafar, 2018) from the COVID-19 context.

Theoretical implications

The theoretical contributions made here have wide applicability. Firstly, the study extends the PCF literature as it has

revealed that PCF is an essential determinant of employees' attitudinal and behavioral outcomes, which is consistent with the previous research (Bal et al., 2013; Fontinha et al., 2014; Turnley et al., 2003). Additionally, this paper is the first to study PCF, work engagement, intrinsic motivation, organizational commitment, and POS in one study, and is the first to study intrinsic motivation as an outcome variable related to PCF. Secondly, the academic attention of existing psychological contract studies is primarily from the breach side, with a consequent dearth of studies from the positive side. In this regard, the study offers a novel lens to understand employees' attitudinal and behavioral outcomes. Thirdly, the overwhelming majority existing psychological contracts research has been discussed from a predominately western context. Studying from non-Western contexts could generalize the findings of the psychological contract literature, and shine some light on the nature of psychological contracts developed under a different cultural context. Fourthly, as many organizations implemented work remotely to contain the outbreak during the COVID-19 pandemic, the working settings of organizations have undergone a number of significant changes. Thus, the study's findings offer new insights for understanding future working settings.

Practical implications

Practical implications proceed from this paper are mainly twofold. Firstly, the proposed model is approved, suggesting that PCF positively impacted employees' work attitudes and behaviors during the COVID-19 pandemic. Therefore, employers and managers have to attach importance to employees' PCF. Especially, if the expectations of employees were well met then the employee reciprocates similar behavior to balance the employment relationship (Eisenberger et al., 2001). Therefore, employers and managers must keep all the promises made to employees worked remotely during the COVID-19 outbreak. Secondly, the result reveals that POS significantly mediates the effect of PCF on employees' attitudes and behaviors during the COVID-19 outbreak. Considering the shift in work settings endows the employees with more significant psychological contract characteristics. Thus, employers and managers need to provide enough support for employees who work remotely. For instance, employers and managers should appreciate employees' extra effort, care about employees' well-being and satisfaction, take pride in employees' accomplishments, and pay attention to any complaints from employees at work.

Limitations and future research

This paper, while contributing, has a few noteworthy limitations. First, as this paper studied the effects of COVID-related circumstances through a cross-sectional research design, future research can be conducted using a longitudinal design that allows us to compare important work-related variables that were expected to be affected by the COVID-imposed circumstances. Second, only 405 questionnaires were collected, so the sample set is not enough large. To strengthen the data stability, it would be better to include a larger sample size in future research. Additionally, this study adopts a snowball sampling strategy to collect data. This sampling method may generate biased samples because the respondents have similar backgrounds. Future studies can be conducted through different methods to collect the required data, such as interviews, observations, and focus groups.

Appendix I. Measurement items

Five-point-type scales were used (1 = strongly disagree, 5 = strongly agree) for all the following measures, which is detailed below.

Psychological contract fulfillment (PCF).

PCF 1: Almost all the promises made by my employer during recruitment have been kept so far.

PCF 2: So far my employer has done an excellent job of fulfilling its promises to me.

PCF 3: I feel that my organization has fulfilled the contract between us.

PCF 4: I feel satisfaction by how I have been treated by my organization.

Work engagement (WE).

WE 1: At my work, I feel that I am bursting with energy.

WE 2: I am enthusiastic about my job.

WE 3: My job inspires me.

WE 4: I am immersed in my work.

WE 5: I get carried away when I'm working.

Intrinsic motivation (IM).

IM 1: I enjoy trying to solve complex problems.

IM 2: I want my work to provide me with opportunities for increasing my knowledge and skills.

IM 3: I want to find out how good I really can be at my work.

IM 4: What matters most to me is enjoying what I do.

Affective commitment (AC).

AC 1: I would be very happy to spend the rest of my career with this organization.

AC 2: I do feel like 'part of the family' at my organization.

AC 3: I do feel 'emotionally attached' to this organization.

AC 4: This organization has a great deal of personal meaning for me.

AC 5: I do feel a strong sense of belonging to my organization.

Perceived organizational support (POS).

POS 1: The organization will appreciate any extra effort from me.

POS 2: The organization would not ignore any complaint from me.

POS 3: The organization really cares about my well-being.

POS 4: The organization takes pride in my accomplishments at work.

Appendix II. Descriptive statistics of the variables

Items	Max	Min	Means	SD	Median	Vari- ance	Kur- tosis	Skew- ness	CV
PCF	5.000	1.000	3.738	0.418	3.750	0.175	3.289	-0.678	0.112
PCF 1	5.000	1.000	3.623	0.526	4.000	0.277	2.133	-0.175	0.145
PCF 2	5.000	1.000	3.847	0.546	4.000	0.298	2.358	-0.573	0.142
PCF 3	5.000	1.000	3.687	0.412	4.000	0.170	2.735	-0.085	0.112
PCF 4	5.000	1.000	3.797	0.486	4.000	0.236	2.643	-0.245	0.128
WE	5.000	1.000	3.665	0.375	3.600	0.141	3.144	-0.079	0.102
WE 1	5.000	1.000	3.750	0.439	4.000	0.193	2.447	-0.152	0.117
WE 2	5.000	1.000	3.833	0.379	4.000	0.144	2.261	-0.169	0.099
WE 3	5.000	1.000	3.553	0.492	3.000	0.242	2.490	0.009	0.138
WE 4	5.000	1.000	3.640	0.472	4.000	0.223	2.565	-0.054	0.130
WE 5	5.000	1.000	3.550	0.398	3.000	0.158	3.289	0.154	0.112
IM	5.000	1.000	3.861	0.434	4.000	0.188	2.100	-0.856	0.112
IM 1	5.000	1.000	3.860	0.434	4.000	0.188	3.163	-0.497	0.112
IM 2	5.000	1.000	4.020	0.414	4.000	0.171	2.636	-0.712	0.103
IM 3	5.000	1.000	3.697	0.484	4.000	0.234	2.467	-0.128	0.131
IM 4	5.000	1.000	3.867	0.439	4.000	0.193	2.411	-0.564	0.114
AC	5.000	1.000	3.541	0.371	3.600	0.138	2.224	0.577	0.105
AC 1	5.000	1.000	3.567	0.437	3.000	0.191	2.489	0.235	0.123
AC 2	5.000	1.000	3.503	0.416	3.000	0.173	3.051	0.361	0.119
AC 3	5.000	1.000	3.543	0.368	3.000	0.135	2.185	0.232	0.104
AC 4	5.000	1.000	3.497	0.444	3.000	0.197	2.096	0.263	0.127
AC 5	5.000	1.000	3.593	0.451	3.000	0.203	2.012	0.001	0.126
POS	5.000	1.000	3.905	0.499	4.000	0.249	3.149	-0.361	0.128
POS 1	5.000	1.000	3.937	0.538	4.000	0.289	2.238	-0.43	0.137
POS 2	5.000	1.000	3.863	0.479	4.000	0.229	2.181	-0.355	0.124
POS 3	5.000	1.000	3.880	0.537	4.000	0.288	3.124	-0.493	0.138
POS 4	5.000	1.000	3.940	0.495	4.000	0.245	2.506	-0.294	0.126

Data Availability The data associated with this study are available on reasonable request from the corresponding author.

Declarations

Conflict of interest There is no conflict of interest.

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