Empowerment or enslavement ? Differential Effects of Proactive and Reactive Work Connectivity Behavior After-Hours on Well-Being at Work: A Boundary Theory Perspective

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Article

Empowerment or Enslavement? Differential Effects of Proactive and Reactive Work Connectivity Behavior After-Hours on Well-Being at Work: A Boundary Theory Perspective

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Abstract: This study examines the differential impact of proactive and reactive job crafting behaviors on job well-being, drawing from the perspective of boundary theory. The increasing popularity of work connectivity behavior after-hours (WCBA) after work has attracted widespread attention from scholars on the relationship between WCBA and employee well-being. One view suggests that the impact of WCBA is negative, while another view suggests it is positive. Obviously, the impact of (WCBA) on well-being at work is still contradictory. To clarify the complexity of the impact of WCBA on well-being at work, based on boundary theory, we divided WCBA into proactive WCBA (PC) and reactive WCBA (RC), and examined the double-edged sword effect of WCBA on well-being at work, as well as the mediating mechanisms of job control and work-to-home conflict, and the moderated effects of boundary segmentation preferences. This study uses empirical sampling method to collect data from 125 employees for a period of five days for quantitative research. The results show that, first, PC has an inverted U-shaped effect on job control, and job control is negatively related to well-being at work. Thus the mediating effect of job control is significant. Second, RC has a negative impact on job control, and there is also a negative relationship between job control and well-being at work. Therefore, the mediating effect of job control is significant. Third, PC and RC are positively correlated with work-to-home conflict, and work-to-home conflict has a significant positive impact on well-being at work. Therefore, the mediating effect of work-family conflict is significant. Fourth, the study also found that integration preference moderates the relationship between work-to-home conflict and PC on well-being at work, that is, the mediating effect of work-to-home conflict is stronger for employees with low integration preference. This study enriches our understanding of WCBA, PC and RC from the perspective of proactive and passive employee behaviors. The study also provides a new interpretation of the impact of WCBA on well-being at work and offers valuable insights for the sustainable development in digital social transformation and the application of boundary theory and the theory of empowerment-subjugation in achieving the United Nations Sustainable Development Goals. In addition, the study deepens our understanding of the heterogeneous regulatory role played by work-family integration preferences in influencing well-being at work under different types of WCBA.

Keywords: proactive work connectivity behavior after-hours; reactive work connectivity behavior after-hours; job control; work-to-home conflict; integration preference; well-being at work

Article Highlights

- To clarify the complexity of the impact of WCBA on well-being at work. we divided WCBA into proactive WCBA (PC) and reactive WCBA (RC), and examined the double-edged sword effect of WCBA on well-being at work
- PC has an inverted U-shaped effect on job control.
- Job control and work–to-home conflict mediated the relationship between WCBA and well-being at work.
- Integration preference moderates the mediated effect of the work–to-home conflict of the relationship between work-to-home conflict and PC on well-being at work.

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1. Introduction

With the rapid development of mobile Internet and information and communication technology (ICT), the traditional office mode of enterprise employees has altered profoundly. Global enterprises have initiated a wave of digital transformation that hastens the evolution of traditional work practices [1]. Increasingly, enterprises are integrating digital communication devices and telecommuting software into daily organizational operations, blurring the boundary between work and personal time for employees [2]. Employees are increasingly using portable communication tools (such as cell phones and tablets) to engage in work activities or connect with colleagues outside of regular work hours. Richardson and Benbunan (2011) termed this phenomenon as non-working time work connected behavior or work connectivity behavior after-hours (hereinafter referred to as WCBA) [3,4]. WCBA has blurred the boundaries between work and personal life [5]. The encroachment of work tasks into non-work domains is increasingly prevalent. Consequently, employees often exhibit mixed feelings and attitudes towards this shift [2]. On the one hand, WCBA can help employees complete their work more flexibly and efficiently [4], improving work efficiency and satisfaction [6,7]. On the other hand, excessive WCBA may hinder psychological disengagement [8] , impede recovery from work [9], and even lead to work-family conflict [10], thereby adversely affecting job performance and attitudes [11,12]. In particular, there remains significant debate regarding the impact of WCBA on well-being at work [4,11].

Well-being at work refers to employees' psychological experiences, satisfaction levels, and emotional states related to their work [13]. Well-being at work is crucial for the sustainable development of society and is a shared goal for both organizations and employees. High levels of well-being generate performance improvements. Therefore, how to enhance employees' well-being at work is a critical management practice issue. Some studies have shown that WCBA complicates psychological detachment [3], extends working hours and workloads [12,14], impacting recovery experiences [8,15], and thereby reducing well-being at work [6]. Other studies have pointed out that WCBA may enhance employees' control over their work [16], increase job flexibility and autonomy [17], and foster more positive perceptions [18], thereby enhancing well-being at work [4]. Consequently, conflicting findings exist regarding the impact of WCBA on well-being at work, and its intricate mechanisms remain incompletely understood [11].

Previous studies have indicated that employees' perceptions of autonomy and control over work-related communication can significantly mitigate work-family conflict and negative attitudes toward work induced by WCBA [18,19]. This suggests that when employees initiate WCBA on their own initiative, it can bring positive outcomes and improve their physical and mental well-being. Conversely, when employees react passively and are unable to resist WCBA, it can harm their physical and mental health [10], resulting in more negative impacts [6]. Therefore, the key to understanding the complex relationship between WCBA and work-related attitudes and emotions lies in whether employees take the initiative to engage in WCBA [4]. Hence, when studying the impact of WCBA on well-being at work, it is essential to differentiate between proactive and reactive WCBA engagement, categorizing WCBA as proactive work connectivity behavior after-hours (PC) and reactive work connectivity behavior after-hours (RC).

According to the boundary theory [20], WCBA, as a typical boundary crossing behavior, will have impact both work and family domains [4]. This impact on the family domain, in turn, affects work attitudes and emotions [5,18]. Therefore, it is crucial to consider both work and family aspects when exploring the pathway impact of WCBA on well-being at work. From the perspective of the work domain path, job control reflects employees' self-regulation over boundaries when engaging in work behaviors within the family domain [16]. WCBA can help employees have better control over their work [18]. Job control can improve employee satisfaction, reduce emotional exhaustion and form positive emotions, thereby enhancing well-being at work [5]. From the perspective of the household domain path, WCBA represents a boundary-spanning behavior where elements from the work domain invade the family domain [11], potentially disrupting work-family balance and causing work-to-home conflict [5]. Work-to-home conflicts are associated with negative work attitudes and emotions [9,21], reducing well-being at work [22]. Therefore, this study focuses on the mediating

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pathways of sense of job control and work-to-home conflict within the work and family domains, respectively, in understanding how WCBA influences well-being at work.

According to the boundary theory [20], individuals exhibit varying preferences regarding the establishment and maintenance of boundaries. Some individuals tend to blur boundaries and even prefer boundary integration, while others favor clear and distinct boundaries and disapprove of boundary crossing [16,23]. When work-related elements encroach into the family domain, individuals with a strong preference for integrating family boundaries are less likely to experience work-family imbalance and encounter fewer work-to-home conflict. Additionally, individuals have less negative job perception. Therefore, family boundary integration preferences were selected for this study as a moderator to examine how WCBA affecting work-to-home conflict.

This study makes four significant contributions by examining the mediation path between WCBA and well-being at work in both work and family domains. Additionally, it identifies the boundary conditions between WCBA and employees' work-to-home conflict. First of all, this study examines the impact of WCBA on well-being at work, specifically dividing WCBA into PC) and RC at the behavioral aspect. The study compares and analyzes the heterogeneous impacts of these two types of WCBA on well-being at work, aiming to provide explanations for the contradictions found in previous research. Secondly, this study reveals an inverted U-shaped effect of PC on job control and well-being at work, offering a unique perspective on understanding the relationship between PC and well-being at work. Thirdly, the study comprehensively considers the two mediating mechanisms of the two domains(work and family) when analyzing the effects of WCBA, in order to avoid the limitation of considering only one domain and to gain a deeper understanding of the complex impact of WCBA on well-being at work. Finally, this study examines the boundary conditions of work-to-home conflict. It contributes to a deeper understanding of individual differences in coping with RC. Overall, this study aims to advance our understanding of the complexity of WCBA and provide valuable insights for both theoretical development and practical implications for promoting well-being at work.

2. Literature Review and Hypotheses

2.1. PC and RC

Based on the research of Gong et al. (2024) [4], this study categorizes WCBA into two types: proactive non-working time work connected behavior (PC) and reactive non-working time work connected behavior (RC). PC refers to employees actively using work-related communication tools to engage in work during non-working hours without receiving work instructions from the workplace (including supervisors, colleagues, and clients). RC refers to employees using work-related communication tools to engage in work during non-working hours in response to work instructions from the workplace (including supervisors, colleagues, and clients). From the perspective of behavioral occurrences, PC involves employees spontaneously altering the permeability or flexibility of their psychological boundaries first, followed by actively adjusting the permeability or flexibility of their physical and temporal boundaries. RC, on the other hand, entails other members of the work domain utilizing mobile technologies (such as smartphones and instant messaging apps) to breach the physical (employees at home rather than at the office) and temporal boundaries (non-working hours) to enter an employee's home domain, thereby altering the permeability or flexibility of that employee's psychological boundaries [20,24]. The former involves autonomously initiated cross-boundary actions, while the latter involves passively responding to cross-boundary work demand [20]. Thus, the underlying drivers of these behaviors differ fundamentally [15], leading to varied impacts on employees' subsequent work attitudes and emotions [18,22]. Consequently, categorizing WCBA types is crucial for understanding why these behaviors can elicit both positive and negative effects on work attitudes and emotions.

 doi:10.20944/preprints202407.1841.v1

2.2. Work Domain Path: PC/RC, Job Control, and Well-Being at Work

Job control refers to the degree to which employees feel that their work can be controlled by themselves, and the job characteristics can give employees the freedom of choice. This control includes the ability to control time planning, schedule arrangement, specific process, material allocation and other aspects [16]. Job control plays an extremely key role in the acquisition of employees' well-being at work [4]. Through the use of work communication tools, employees can control the progress of work and give feedback anytime and anywhere, which is conducive to improving job control [2,7]. However, constant work connectivity forces employees to always be online [12]. In addition, employees passively respond to the continuous call from remote work [17], and they can hardly control the frequency and time of passive response [11], which greatly weakens employees' autonomy over their schedule, working methods and decision-making [2], that is, their job control is reduced. This contradiction is known as the "empowerment/enslavement " paradox [25,26].

Gong et al. (2024) argue that the key to the "Empowerment/Enslavement" Paradox lies in distinguishing between Personal Connectivity (PC) and Remote Connectivity (RC) [4]. The modes in which PC and RC alter boundaries differ, which determines the types of interruptions they cause and consequently their differing impacts on job control [27]. PC induces only internal interruptions within individuals, which make employees feel in control of their own volition, thereby providing a sense of mastery over time and space management [4]. In contrast, RC constitutes an external interruption that often demands immediate response, characterized by unpredictability and enforceability, disrupting employees' original schedule [4]. Hence, PC enhances employees' job control, whereas RC diminishes it.

However, when the PC exceeds a certain limit, employees also start to feel less in control of their job. If an employee is immersed in his or her work almost all day, he or she has actually become a "slave" to his or her work [25], dominated and controlled by the work, and the flexibility and control of his or her work are greatly damaged [28]. Constant online work can result in employees not being able to make autonomous decisions about work schedules, work methods, decision-making, etc. Employee autonomy at work is diminished [29]. Therefore, excessive PC will weaken job control. Thus, PC has an inverted U-shaped effect on job control. At low levels of PC, PC enhances employee job control. At high levels of PC, PC will instead weaken employees' job control.

Job control reflects the autonomy of employees in managing boundaries [16]. This autonomy can provide employees with more choices between work and family domains, and bring positive emotional and psychological resources to employees [20]. Positive emotions can directly improve employees' well-being at work [13]. And positive psychological resources can also help employees obtain other resources, reduce emotional exhaustion caused by work requirements consuming work resources [2], and thus increase employees' well-being at work. A number of existing studies have confirmed that job control can improve well-being at work [30].To sum up, PC and RC can affect well-being at work by affecting job control. Based on the above discussion, this study proposes the following hypotheses:

H1a: *Job control mediates the inverted U-shaped relationship between psychological contract (PC) and job satisfaction. Excessive or insufficient PC hinders employees from attaining job control, thereby reducing job satisfaction. Only a moderate level of PC maximizes employees' job control and subsequently enhances well-being at work.*

H1b: *Job control mediates the negative impact of role conflict (RC) on well-being at work. An increase in RC weakens employees' job control, consequently diminishing well-being at work.*

2.3. Family Domain Paths: PC/RC, Work-to-Home Conflict, and Well-Being at Work

Work-to-home conflict refers to the extent to which individuals perceive that work interferes with their responsibilities and roles in taking on the family and makes their time and energy in the family domain shrink [31,32]. Specifically, the work-to-home conflict is divided into three aspects: time conflict, pressure conflict and behavior conflict [32]. Time conflict refers to the time spent at work

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that makes it difficult for individuals to participate in family activities and complete family duties. Stress conflict means that work pressure spills over to the family field, and individuals are still psychologically focused on work at home, so that it is difficult to meet family needs. Behavioral conflict is when the behavior that is beneficial for work contradicts the behavior that is expected in the family.

WCBA increases work-to-home conflict from three aspects: time, recovery and conversion. In terms of time, work connectivity is reflected in the fact that employees are still working after work hours, which will occupy the time originally used for family company [33], thus resulting in time conflict. In terms of recovery, WCBA will hinder employees' psychological detachment [12,34], resulting in the compression of employees' normal rest time and the failure to form effective recovery experience [35]. Over-consumed resources that cannot be replenished in time will lead to insufficient resources [36], resulting in stress [37], and thus stress conflicts. In terms of switching, the intermittent nature of WCBA requires individuals to constantly switch between the two domains of home and work [20]. After work, individuals should always pay attention to the information in work, and the priority of work role is usually higher than that of family [11]. This can cause individuals to be absent-minded when engaging in family role behaviors [2,10]. This behavior, although beneficial for work, fails to meet the expectations of family role behavior [5], and thus may lead to behavioral conflicts.

More precisely, we argue that RC induces employees to have more work-to-home conflict relative to PC. From the perspective of employees' psychological preparation, employees engaged in PC have spontaneously increased the flexibility of boundary crossing to the work field in advance, and have been psychologically prepared to work from home after work. Employees engaged in RC have difficulty anticipating when job demands will occur and are often asked to respond unprepared [4]. This difference has three effects: Firstly, employees engaged in PC can arrange the specific time of WCBA in advance, which can buffer the adverse impact of WCBA on the family to a certain extent. But in the same case, RC lacks time autonomy [28]. Employees need to respond passively to job demands. This leads to more time conflicts [6]. Secondly, compared with employees engaged in PC, employees engaged in RC are usually not psychologically prepared to face RC and face greater threat of resource loss, so they feel greater work pressure [4,37]. This can lead to more stressful conflicts. Thirdly, employees engaged in PCS generally avoid PC interference with important family activities [37]. However, employees engaged in RC cannot predict when RC will occur, so RC will cause additional behavioral conflicts.

The negative impact of work-to-home conflict on well-being at work has been confirmed by some studies [2,38]. From the perspective of time conflict, if individuals often use the time that should be used in the family domain to work, the support of resources from the family domain will be reduced. This will affect the completion of subsequent work and lead to job burnout [11], which in turn reduces well-being at work. From the perspective of stress conflict, when work stress spills over to the family domain, employees cannot recover the mental energy lost at work at home. This will further lead to increased stress [6], which will lead to emotional exhaustion in subsequent work [4], and therefore reduce job happiness. From the perspective of behavioral conflict, if employees often engage in behaviors beneficial to work after work, they cannot meet the behaviors expected by family members. This will affect employees' performance of their family roles and may cause dissatisfaction among family members [5], which will be transmitted to employees and employees will further transfer such negative emotions to their attitudes toward work [11]. Therefore, it reduces job happiness.

H2a: *Work-to-home conflict mediates the positive relationship between PC (RC) and emotional exhaustion. The increase of PC (RC) will exacerbate work-to-home conflict, thereby diminishing employees' well-being at work.*

H2b: *Compared to PC, RC leads to a greater extent of work-to-home conflict, ultimately resulting in a more pronounced reduction in well-being at work.*

Boundary integration preference refers to the degree of preference of individuals to connect affairs in the work domain to the home domain and minimize the boundary between the two [23]. Integrators (i.e. employees who prefer to integrate work into their home domain) like to bring the

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unfinished work to the family after coming home from work, and tend to reduce the boundary between work and family so that work affairs can flow to the family field [23]. Integrators prefer their work and family boundaries to be highly flexible. Employees with low integration preference prefer to determine strict and impermeable boundaries between the two domains [6]. WCBA is the penetration of work elements into the home domain, which facilitates boundary integration preferences to continue completing work during off-hours [39]. This satisfies the preference of employees to work continuously at home[39]. Therefore, for boundary integration preference, the impact of WCBA on work-to-home conflict is well alleviated [18]. Employees with a low level of boundary integration preference do not want work matters to disturb their families [11], and when it happens that work time encroaches on family leisure time, such employees are more likely to destroy their work-family balance and feel higher levels of work-to-home conflict [14], and the effect of WCBA on work-to-home conflict is strengthened. Therefore, individual boundary integration preferences are able to mitigate WCBA induced the work-to-home conflict.

More precisely, we argue that, relative to RC, relationships in PC-induced work-to-home conflict are affected to a higher degree by individual boundary integration preferences. According to the boundary theory [20], in addition to individual boundary integration preferences, work-to-home conflict also depends on employees' autonomy in boundary management [6]. Employees with more autonomy in boundary management perceive less work-to-home conflict [4]. Employees take the initiative to manage the boundary and have stronger independent choice of boundary management. Therefore, employees engaged in PC have stronger autonomy in boundary management. Therefore, compared with employees engaged in RC, employees engaged in PC have greater autonomy in boundary management. Work-to-home conflict is more easily mitigated by personal boundary integration preferences. Based on this argument, this study proposes the following hypothesis:

H3a: *The negative impact of PC (RC) on well-being at work through work-to-home conflict is mitigated by integrators. When integrators' boundary integration preference is higher, the effect of PC (RC) on work-to-home conflict is weaker, and then the effect on well-being at work is weaker.*

H3b: *Relative to RC, the relationship "OC→ work-to-home conflict → well-being at work" is more mitigated by individual integration preferences.*

According to the hypotheses, this study proposes the theory model (See Figure 1).

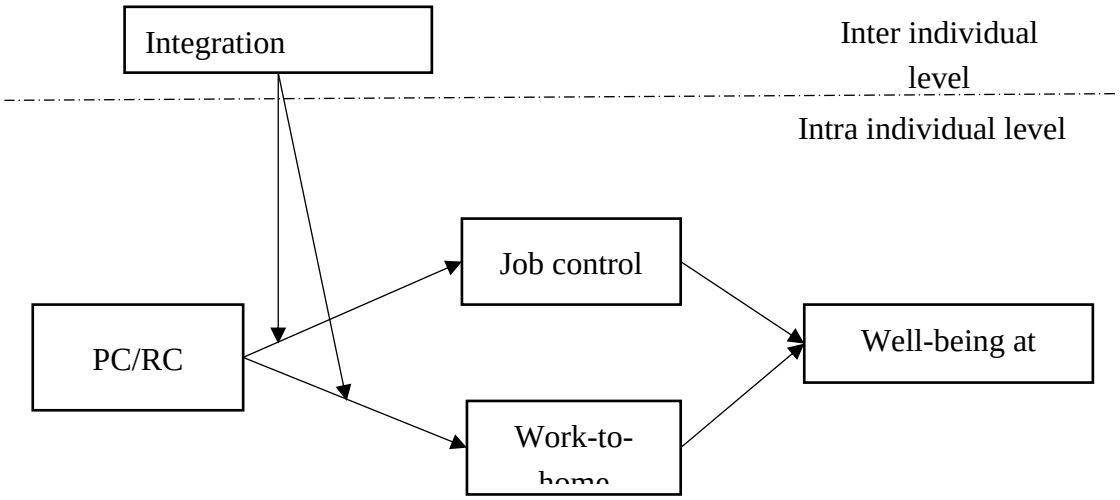

Figure 1. Theoretical Model.

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3. Materials and Methods

3.1. Sample and Procedures

The subjects engaged in NTWCB are usually knowledge-based employees engaged in digital work, such as employees in the financial and Internet industries. Therefore, this study selected MBA students from Chinese university business schools as participants, mainly from industries such as fintech, software services, and online education. We conducted a 5-day questionnaire survey using empirical sampling method.

Firstly, the research team members should make an appointment in advance and contact the participants who voluntarily participate in the survey. Secondly, in order to facilitate cross regional participants to participate in the survey simultaneously, research members invited participants to participate in the survey by creating a temporary anonymous WeChat group, and collected and coded basic information of the participants through questionnaire collection. Then, pre prepared electronic questionnaire links were sent to the group at different time periods, and participants were required to complete the questionnaire between 21:00 and 22:00. Finally, all encoded questionnaires were matched at the individual level to form daily survey questionnaires for each participant. Especially, integration preference is a relatively stable individual characteristic with a small daily fluctuation range, so the Integration preference scale was only filled out by participants on the first day.

A total of 150 employees participated in the survey, and samples that were unable to complete basic information matching and those with obvious patterns in answering were excluded. Finally, a total of 625 daily survey questionnaires were obtained from 125 participants, with an overall effective response rate of 83.3%. Among 125 participants, 75 were females, ranging in age from 21 to 56 years old (M=29) 78, SD=6.71), working hours in the current organization range from 1 year to 12 years (M=6.72, SD=7.27), and working hours per week range from 40 to 60 hours (M=45.98, SD=7.33).

3.2. Measurements

The variables involved in this study were measured using scales widely used in previous studies, and some issues were slightly revised based on the actual research situation. PC and RC were scored using a 6-point Likert scale, while the remaining variables were scored using a 7-point Likert scale.

The PC and RC Scale were adapted from the NTWCB scale developed by Gadeyne et al. (2018)[14] and Gong et al. (2024)[4], and this study followed this approach. In order to distinguish between Pc and RC, this study added the time and frequency of asking respondents whether they were "actively initiated" or "required" to engage in work activities using smartphones and computers during off hours. NTWCB, Pc, and RC Scale each have 4 items. One of the items on the NTWCB scale is "How many times did you use your computer for work outside of work hours today?". After adapting the item, the corresponding examples for the Pc and RC scales are "How many times have you actively used a computer for work outside of work hours today" and "How many times have you been asked to use a computer for work outside of work hours today".The value of Cronbach's alpha for PC was 0.83; The value of Cronbach's alpha for RC was 0.84。

Job control was measured using a 4-item scale developed by Kossek et al. (2006)[16].A sample item is "I can get through difficult times at work because I have experienced before difficulties". The value of Cronbach's alpha for job control was 0.83.

Work-to-home conflict was measured using a 6-item scale developed by f Carlson et al. (2000)[40]. The sample items include "My work keeps me from my family activities more than I would like". The value of Cronbach's alpha for organizational support was 0.87.

Integration preference was measured using a 4-item scale developed by Kreiner's (2006) Kossek et al. (2006)[23]. A sample item is described as "I am immersed in my work". The Cronbach's alpha was 0.84.

Well-being at work was measured using a 6-item scale developed by Zheng et al. (2015)[13].Sample item was "I find real enjoyment in my work". The Cronbach's alpha for this scale was 0.88.

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4. Results

4.1. Confirmatory Factor Analysis and Common Method Variance

This study selected Mplus 8.3 for multi-level confirmatory factor analysis (CFA). The results of comparing multi-level CFA result models indicated that the seven factor model, consisting of PC, RC, job control, work-to-family conflict, integration preference, and well-being at work ($\chi 2/df=2.38$, CFI=0.91, TLI=0.90, SRMR=0.06, RMSEA=0.04), demonstrated a superior fit to the data compared to alternative other models. Therefore, the results indicated that the discriminant validity of the seven variables is good.

The results of Harman's single factor test showed that the first factor only explained 39.63% of the total variation, which is lower than 50% [41]. Therefore, in this study, the common method variance problem was not serious.

Given that the research variables involve cross level issues, in order to ensure the accuracy of the model, the variance of the variables was differentiated within and between individuals before hypothesis validation. The results were show (see Table 1) that the ICC (1) of each variable ranges from 0.71 to 0.83, indicating that this study is suitable for using multi-level analysis. The proportion of variance within an individual ranges from 17% to 29%, indicating fluctuations in key variables between days.

Table 1. The results of Descriptive Statistics, Correlations and Multilevel test of variables.

variables	M	SD	1	2	3	4	5	6	ICC(1)and inter Individual variance percentage
Intra individual level									
1.PC	3.19	1.48							0.72(28%)
2.RC	3.67	1.66	0.57***						0.71(29%)
3.JC	2.89	1.21	-0.15*	-0.23***					0.78(21%)
4.WC	2.57	1.02	0.22**	0.32***	-0.22***				0.74(26%)
5.WW	3.44	1.56	-0.35**	-0.29**	0.28***	-0.61***			0.83(17%)
6. PC*PC	2.26	2.37	0.36***	0.35***	-0.24***	0.14*	0.15**		
intra individual level									
1.GE	1.60	0.49							
2.AG	29.78	6.71	-0.19						
3.ED	2.46	0.85	-0.06	-0.10					
4.MA	2.61	2.51	-0.33***	0.17**	0.44***				
5.WT	6.72	7.27	-0.13*	0.24***	0.35***	-0.36***			
6.IP	2.83	0.64	-0.12*	-0.11*	0.07	-0.25***	-0.36***	0.01	

Note: JC, WC, WW, GE, AG, ED, MA, WT, and IP respectively represent job control, work-to-home conflict, well-being at work, Gender, age, education, marriage and childbirth, years of work experience, and Integration preference.

4.2. Descriptive Statistics and Correlations

Table 1 presents descriptive statistics and correlations of the variables. PC squared was negatively related to job control ($r = -0.24$, $p < 0.001$), Indicating that the impact of PC on job control was a curve effect, and RC was negatively related to job control ($r = -0.23$, $p < 0.001$), moreover, positively correlation between job control and well-being at work (r=0.28, p<0.001). Additionally, PC was positively related to work-to-home conflict ($r = 0.22$, $p < 0.001$), and RC was positively related to work-to-home conflict ($r = 0.32$, $p < 0.001$), meanwhile, work-to-home conflict was positively related to well-being at work ($r = -0.61$, $p < 0.001$). Therefore, This result meeted theoretical expectations and preliminarily supported the research hypothesis.

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4.3. Hypothesis Testing

When all control variables were included in the model and controlled for, this study tested the research hypothesis through multi-level path analysis. As shown in Figure 2, the square term of PC had a negative association with job control (β=-0.09, p<0.01), indicating that PC had an inverted U-shaped effect on job control. And job control was positively associated with well-being at work (β=0.23, p<0.01). The mediating effect value of "PC → job control →well-being at work " was 0.02, furthermore, Monte Carlo simulation was show that the 95% confidence interval did not include 0 ([0.002,0.05]), indicating job control. And RC was negatively related to job control (β=-0.15, p<0.05), meanwhile, job control was positively related to well-being at work (β=0.25, p<0.01), moreover, the mediating effect value of "PC → job control →well-being at work " was 0.04, and the 95% confidence interval did not include 0 ([0.003, 0.09]), indicating that job control mediated a positive correlation between RC and well-being at work. Thus hypothesis 1a and 1b were supported.

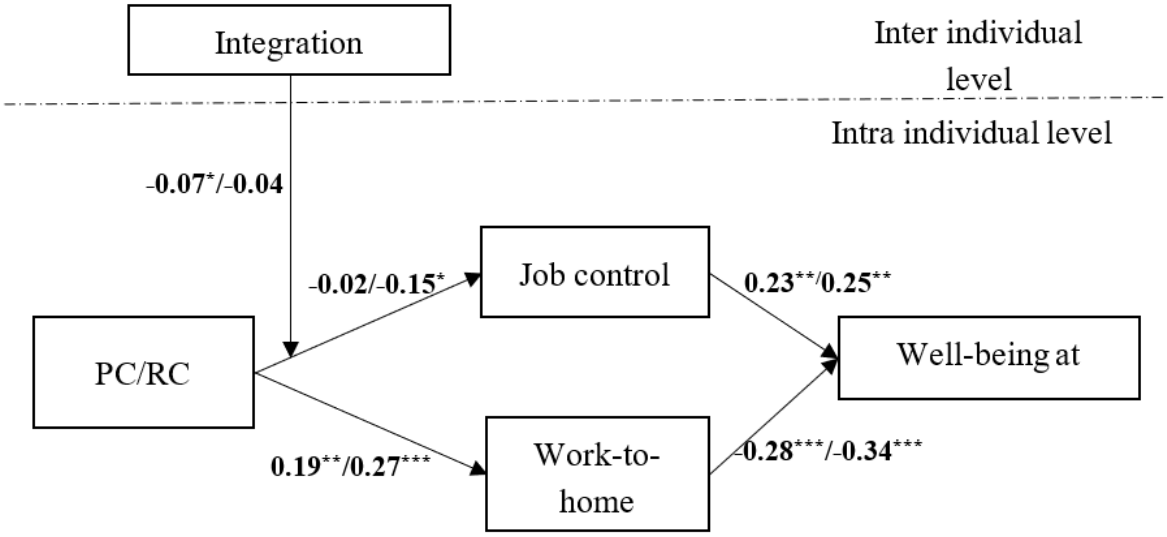

Figure 2. Multilevel path analysis results: PC/RC affects well-being at work.

As shown in Figure 2, PC and RC were positively associated with work-to-home conflict(β=0.19, p<0.01; β=0.27, p<0.001), and work-to-home conflict were positively associated with well-being at work (β=-0.28, p<0.001; β=-0.34, p<0.001), moreover, the mediating effect value of work conflict families between PC and work-to-home conflict was -0.06, and the 95% confidence interval did not include 0 ([-0.08,-0.001]), while the mediating effect value of work conflict families between RC and work-to-home conflict was -0.09, and the 95% confidence interval did not include 0 ([-0.11,0.001]). Meanwhile, the difference in path coefficients between "PC →work-to-home conflict" and "RC →work-to-home conflict" was also significant (Δ β=-0.17, p<0.05). Thus hypothesis 2a and 2b were supported.

As shown in Figure 2, the coefficient of the interaction term between PC and integration preference was significant (β=-0.07, p<0.05), indicating that integration preference alleviated the effect of PC on work-to-home conflict. The moderated mediating effect value of "PC →work-to-home conflict→well-being at work" is -0.03, and the 95% confidence interval does not include 0 ([-0.04, -0.002]), indicating that integration preference moderated the mediating role of work-to-home conflict between PC and well-being at work. However, the coefficient of the interaction term between RC and integration preference was not significant (β=-0.04, p>0.05), and indicating that integration preference did not moderated the mediating role of work-to-home conflict between PC and well-being at work. Thus hypothesis 3a was partial supported, while hypothesis 3b was supported. We speculate that the reason why integration preference cannot buffer the positive effect of RC on work-to-home conflict may be due to the unpredictability of RC, which made it difficult for employees to plan their work from home time in advance, resulting in employees still perceiving higher levels of work-to-home conflict when RC was coming.

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5. Conclusions and Discussion

In the era of digital transformation, enterprises are increasingly adopting digital communication technologies, aiming to enhance efficiency, convenience, and flexibility in organizational communication management. Consequently, WCBA has become more prevalent [34]. Previous studies have explored the impact of flexible work arrangements on employee well-being [22,30,42]. However, the paradox of technology empowerment versus enslavement has sparked considerable debate regarding the relationship between non-working time connectivity and employee well-being [4]. Moreover, since WCBA represents boundary-crossing behavior, we aim to elucidate its intricate relationship between WCBA and well-being at work from two mechanisms: work domain path and family domain path.

Drawing on boundary theory, this study distinguishes between PC and RC. It investigates how job control and work-to-home conflict mediate the relationship between WCBA and well-being at work, as well as the moderating role of integration preference. The results suggest that in the work domain, both excessive and insufficient PC have negative effects on job control, leading to decreased well-being at work. However, the appropriate level of PC can maximize job control and ultimately increase job satisfaction. On the other hand, reactive communication has a detrimental impact on job satisfaction by weakening job control. In the home domain, both PC and RC contribute to work-to-home conflict, resulting in lower well-being at work. However, the influence of PC on well-being at work is moderated by integration preference. Specifically, compared to employees with higher integration preferences, employees with lower integration preferences are more likely to develop work conflict families after engaging in PC work, leading to greater work conflict families.

5.1. Theoretical Contributions

First, based on boundary theory, we subdivided WCBA into PC and RC, responding to scholars' calls for a clearer delineation of WCBA and related constructs [15]. Simultaneously, we further elaborated on the "empowerment/enslavement" paradox with specific empirical studies, elucidating the the double-edged sword effect of WCBA on well-being at work. Although previous research explored the relationship between WCBA and well-being at work [22,30,42], the lack of prior differentiation among WCBA's categories may have been a significant reason for inconsistent findings in earlier studies. From an empowering perspective, PC can empower employees, thereby yielding positive outcomes. Conversely, from an enslaving perspective, excessive PC and RC are perceived as burden, leading to adverse consequences [25,26]. Therefore, this study offers a novel interpretation of the "empowerment-enslavement" paradox, enriching understanding of WCBA, PC, and RC from the perspective of "empowerment/enslavement" paradox of technology.

Secondly, this study examines well-being at work as the outcome variable, in response to the call to consider well-being at work as a desired outcome rather than a mediating variable [13]. Previous research often treated well-being at work as a mediating factor in organizational and employee performance, but there is a new trend in research to view well-being at work as the ultimate goal for both organizations and employees [42]. This study follows this new trend by specifically linking WCBA to well-being at work through the use of boundary theory and the "empowerment/enslavement" paradox of technology. Thus this study provides valuable insights for the application of boundary theory and the "empowerment/enslavement" paradox of technology in the sustainable development of the digital society, and finally to achieve ‘health and well-being at work’ (SDG-3).

Third, based on the boundary theory, this study introduces job control and work-to-home conflict as significancant variables in the work domain path and family domain path, revealing the multi-domain paths through which WCBA affects well-being at work, thus enriching the application scope of the boundary theory. Existing literature indicates that WCBA is a typical behavior that crosses the boundaries of work and family [5,20], and therefore its impact on well-being at work needs to consider both the work domain and the family domain in order to better understand the complexity of WCBA's effect on well-being at work [4,42]. This study shows that in the work domain, PC and RC have heterogeneous effects on well-being at work through t job control; only within a moderate range of PC does it lead to an increase in job control with increasing PC, while exceeding a

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certain range reduces job control, thereby affecting well-being at work, and RC only leads to a decrease in job control, consequently decreasing well-being at work. In the family domain, PC and RC both lead to work-to-home conflict and subsequently affect well-being at work. Therefore, the beneficial effects of WCBA on well-being at work only exist in the work domain path, and PC needs to be limited within a certain range. In the family domain path, PC and RC only have negative effects on well-being at work. This study supplements previous research conclusions on the double-edged sword effect of WCBA, providing a unique understanding for relevant literature on the relationship between WCBA and work attitudes and emotions.

Fourth, the study enriches the moderating effect of work-family integration preference on the impact of WCBA. Some previous studies often considered variables such as family support, work achievement, work-family integration preference, and responsiveness from superiors as moderators in the impact of WCBA [2,4,5,14]. However, based on boundary theory, this study found that the moderating effect of work-family integration preference is not consistent in the impact of PC and RC, with work-family integration preference only buffering the effect of work-to-home conflict in PC, but not in RC. This conclusion deepens our understanding of the heterogeneous moderating role of work-family integration preference in the impact of different types of WCBA on well-being at work.

5.2. Practical Implications

From the results of this study, two important management implications can be drawn. First, the results show that the gain effect of WCBA on well-being at work is realized through increasing PC, but excessive PC can lead to a decrease in job control, resulting in reduced well-being at work. Therefore, organizations need to provide tools for employees to control their work, such as portable office and communication devices. However, it is important to note that the detrimental effects of excessive engagement in WCBA should not be overlooked, and employees should be reminded to control the duration of their PC. In response to the significant negative effects of RC, including negative impacts in both the family and work domains, organizations should minimize rc as much as possible and provide support and necessary compensation for employees when they need to engage in RC in emergency situations, in order to reduce the multiple negative impacts of RC. Additionally, organizations can minimize the unpredictability of WCBA by establishing organizational norms, to maximize the reduction of the negative effects of WCBA on employees.

Second, we found that integration preference can reduce the adverse effects of PC on work-to-home conflict and subsequently buffer the negative impact on job satisfaction, but this buffering effect does not exist in the context of RC. Based on these research findings, organizations need to tailor their approach to provide opportunities and pathways for employees with a high preference for work-family integration to engage in PC, while for employees with a low preference for work-family integration, even if they want to engage in PC, the cost is often greater and leads to greater work-to-home conflict, making it not worth it. Therefore, organizations should try to minimize WCBA for employees with a low preference for work-family integration.

6. Limitations and Future Research

First, the study exclusively focused on investigating the moderating role of integration preference, an individual-level factor. However, there are other social support factors, such as organizational support, leadership support, colleague support, and family support, which also play a role in influencing the impact of WCBA. Therefore, future research should explore how these external supportive factors affect the relationship between WCBA and well-being at work, providing a more comprehensive understanding of the complexity of this relationship.

Second, in the research design, all variables except for demographic variables were measured consistently from 21:00 to 22:00 daily. However, this approach did not allow for separate measurements of independent variables, mediator variables, and outcome variables at different time points throughout the day. As a result, the full potential of the empirical sampling method in reducing method bias was not fully realized, despite the relatively low severity of common method

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bias in the study. Future research could benefit from measuring various types of variables at multiple time points to effectively minimize common method bias.

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Institutional Review Board Statement: According to relevant national legislation, ethical approval is not required for this type of research. This is a non-interventional study that uses anonymous information data, conforming to Article 32 of the Measures for Ethical Review of Life Sciences and Medical Research Involving Human Beings that issued by the National Health Commission, Ministry of Education, Ministry of Science and Technology, and Bureau of Traditional Chinese Medicine on the Chinese government website on 18 February 2023. Details can be found at https://www.gov.cn/zhengce/zhengceku/2023-02/28/content_5743658.htm, accessed on 18 January 2024.

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