

Work Connectivity Behaviour After-Hours: A Literature Review and Prospects

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Abstract

Work connectivity behaviour after-hours (WCBA) denotes the practice of utilizing mobile communication devices by employees for engaging in work activities or connecting with work-related individuals at any time and place, including non-working hours such as before work, during lunch breaks, and after work. With the progress of communication technology, WCBA has gradually become one of the research hot spots, but its systematic review research is relatively scarce. This study reviews the relevant literature on WCBA, this paper comprehensively comprehends the research on the definition, types and measurement of WCBA, analyses and evaluates its theoretical logic and existing deficiencies by constructing a framework of its antecedents, outcomes, mediators, moderators, and looks forward to future research directions, with a view to providing a reference for subsequent relevant research.

Keywords: Work Connectivity Behaviour After-Hours, Work Outcome, Personal Outcomes Work Affect, Work Behaviours.

Introduction

Businesses have ushered in a new era of office transformation thanks to the quick advancement of science and technology, the blending and modernizing of computer and communication technologies, the growth of Internet connectivity, the popularity and diversity of intelligent instant messaging gadgets, and the expansion of Internet coverage. Globally, after work, over 32% of American workers and 22.4% of workers in European countries regularly get emails linked to their jobs (Dettmers et al., 2016). From China perspective, the available data indicates that China's national average weekly working time is 48.9 hours, with an average daily working time of nearly 10 hours, which is among the highest in the world (China, 2023). According to a survey conducted by 51JOB, a human resources service provider in China, 84.7% of domestic employees reported being unable to disconnect

from work outside of working hours and still needing to attend to work-related information. Only a small fraction of employees, just under 10%, were able to achieve freedom from work (Daily, 2022). As a result, the frequent and unavoidable phenomenon of out-of-hours connectivity has become one of the issues that modern companies and organisations have to deal with. This phenomenon seems to have become an important corporate issue of global concern. For instance, from an international perspective, in 2017, France enacted a regulation known as the "right to disconnect," which requires enterprises of a specific size to specify clearly the periods when availability is not necessary (Schlachter et al., 2018). Some European nations, including Portugal and Belgium, as well as businesses, like BMW and Volkswagen, have outlawed work connectivity during non-working hours due to concerns that it negatively impacts the mental and physical well-being of their workforce (Yang et al., 2023). In China's perspective, China's relevant platforms (e.g., "DINGDING") have also issued a call to "let office return to office, let social return to social" (WU & GUO, 2022).

Employees frequently utilize portable wireless devices these days to stay in touch with their work during downtime. One popular practice is to keep smartphones on in the evenings and check them frequently for business-related texts and emails (Boswell & Olson-Buchanan, 2007; Jarvenpaa & Karl Lang, 2005). This behavioural phenomenon is called work connectivity behaviour after hours (WCBA) (Richardson & Benbunan-Fich, 2011; Richardson & Thompson, 2012). WCBA has gained a lot of interest recently since it eliminates the time and location constraints of traditional work and blurs the lines between the work and nonwork realms (Cheng et al., 2022).

Some progress has been made in the research of the WCBA. In terms of impacts, WCBA tends to show a double impact; on the one hand, there are benefits to WCBA, including improved efficiency and more flexibility in handling job demands (Boswell & Olson-Buchanan, 2007; Schlachter et al., 2018). WCBA may boost workers' autonomy and flexibility at work, which would enhance their job satisfaction (Diaz et al., 2012; Richardson & Thompson, 2012) and work engagement (Baumeister et al., 2021; Ter Hoeven et al., 2016; Yang et al., 2023; Zhu et al., 2024). On the other hand, WCBA has a negative impact on work-life conflict (Li & Yuan, 2018), work-leisure conflict (Wang et al., 2022), employee psychological distress (Dong et al., 2022), job satisfaction (Cheng et al., 2022), turnover intention (Tao et al., 2023), and work alienation (He & Sun, 2022), and at al. Moreover, the double-edged sword effect of WCBA on employee occupational mental health (work engagement and job burnout) was examined in a recent study by Zhu et al (2024), and the impact of WCBA on thriving at work is a "double-edged sword" (Yang et al., 2022). Given the co-existence of negative and positive impacts, a comprehensive understanding and appreciation of out-of-hours and work-related e-communications will provide important guidance for business practices.

Literature Searching and Screening

The idea of "work connectivity behaviour after hours" was first proposed by Richardson and Benbunan-Fich in 2011, hence the study's literature search was restricted to the period of January 2011 to July 2024. Firstly, we searched on Web of Science (WoS) and Scopus as the search databases. Scopus was utilized for the study because it encompasses papers from a range of areas, including the social sciences, and contains both ISI and Scopus-indexed publications (Fahimnia et al., 2015). The WoS is an excellent digital database that is widely used by scholars worldwide and has gained traction as a standard instrument for finding and

assessing all kinds of publications (Thelwall, 2008). Secondly, all were searched using the keywords “work connectivity behave after hours” or “work-related ICT use outside work hours” or “work-related smartphone use during non-work time” or “work-related electronic communication during non-work time” or “work-related ICT demands.” The search is restricted to journals only. The final result was 56 in English. Thirdly, the searched literature was screened, and those with little relevance to WCBA were eliminated, leaving 48 English articles for further analysis and sorting.

Research Objectives

Based on 48 articles, this paper firstly reviews the concept and measurement of WABA; secondly, In-depth analyses of the above 48 articles, it is summary the antecedents, effects and mechanisms of WCBA at the individual, team and organizational levels, and constructs an integrated analytical framework; lastly, it sums up the shortcomings of the existing studies and looks forward to future research directions in terms of the refinement of the concepts and measurements, the expansion and integration of WCBA into the existing relevant studies, the exploration of the intrinsic formation mechanism of WCBA, the enhancement of western contextual and cross-cultural comparative studies, and the further improvement and enrichment of relevant research designs. Finally, we summarize the shortcomings of existing studies and look forward to future research in terms of conceptual and measurement improvement, the expansion and integration of WCBA into existing related studies, the excavation of WCBA's intrinsic formation mechanism, the enhancement of comparative studies in Western contexts and across cultures, and the further improvement and enrichment of related research designs.

The contribution of this paper is to clarify the current status and lineage of WCBA research, the deficiencies, and possible future research directions, with a view to drawing more attention to WCBA from management researchers and the practice community, and to provide reference for subsequent deepening of WCBA research and practice.

The Concept and Measurement of WCBA

The Concept of WCBA

In order to provide a clearer and more intuitive understanding of the concept of WCBA. Firstly, this study compares it with similar concepts. One is “work overtime,” which is defined as “the act of working outside normal working hours as stipulated in the labor contract” (Hollmann, 1979), which focuses on working hours. Another is “telecommuting”, which is defined as “a type of work arrangement in which individuals use electronic devices to interact with others inside and outside the organization outside of their primary office location” (Gajendran & Harrison, 2007), with a focus on location boundaries. The last one is “work-related cell phone,” which means handling work-related matters via mobile phone with a focus on mobile phone communication equipment (Ragsdale & Hoover, 2016). As shown in Table.

Table 1

Differentiation of WCBA from similar concepts

Variable	Author (Year)	Definition	Focuses
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WCBA	Richardson & Benbunan-Fich, 2011	The behaviour of an individual using technology during non-working hours to participate in work or interact with colleagues at work.	Time boundary
Work Overtime	Hollmann, 1979	The act of working outside normal working hours as stipulated in the labor contract.	Working hours
Telecommuting	Gajendran & Harrison, 2007	A type of work arrangement in which individuals use electronic devices to interact with others inside and outside the organization outside of their primary office location.	Location boundaries
Work-Related Phone	Cell Ragsdale & Hoover, 2016	Handling work-related matters via mobile phone.	Mobile phone communication equipment

Secondly, the academic community has developed a unified understanding of the meaning of WCBA. WCBA refers to the conduct of workers in an organization who engage in work-related activities outside of regular business hours by using electronic communication devices (Richardson & Benbunan-Fich, 2011), covering a technological approach more broadly, including devices such as smartphones, laptops, tablets, etc., with a focus on time boundaries. WCBA is characterized by the following four aspects: (1) It occurs during non-working hours and at irregular times, such as in the morning before work, during lunch breaks, or after work. (2) The individual's use of an electronic communication device to communicate with a work-related person is for work-related purposes, and the content of the communication is work-related. (3) Individuals must be contacted through electronic communication devices, such as WeChat, QQ, WhatsApp, Zoom, telephone, and email. (4) The behaviour was of an additional compulsory nature, and overtime payments could not be obtained from the organization (Meng et al., 2018).

However, at present, scholars have not formed a unified name for the concept of WCBA; some scholars have incorporated the technological means by which the behaviour is based, using the terms "work-related ICT use outside work hours" or "work-related smartphone use during non-work time" (Gadeyne et al., 2018; Gupta et al., 2017; Lanaj et al., 2014). It is all focused on smartphone devices. Some other scholars use the term "work-related electronic communication during nonwork time," which covers a wider range of technological devices,

including smartphones, laptops, tablets, and so on (Boswell et al., 2016). Moreover, some scholars use terms such as "work related ICT demands" (Y. Park et al., 2020). As shown in the Table 2. This paper uses the more integrated, inclusive, and concise WCBA instead, as these terms are consistent with the meaning of the WCBA (Richardson & Benbunan-Fich, 2011).

Table 2

Similar expressions to WCBA

Expression	Connotation	Representative Author
WCBA	The conduct of workers in an organization who engage in work during non-working hours using electronic communication devices.	Richardson & Benbunan-Fich, 2011
Work Related ICT Use outside Work Hours	The degree to which people use ICTs to do work after hours.	Gadeyne et al., 2018
Work Related Smartphone Use during Non-Work Time	The degree to which people use their smartphones for work-related purposes outside of regular business hours.	Gupta et al., 2017
Work-Related Electronic Communication during Nonwork Time	Acts of communication at work that people conduct outside of regular business hours using electronic communication technology.	Lanaj et al., 2014
Work-Related ICT Demands	Frequency of work-related communications experienced by individuals during non-work time.	Y. Park et al., 2020

The Dimensions and Measurement of the WCBA

Current measurements for WCBA fall into two broad categories. In one category, there have been studies that have used the frequency or duration of work processing using communication devices as a measure of off-hours work connectivity behavior. Boswell and Olson-Buchanan (2007), earlier discussed the structural dimension and measurement of WCBA. They defined WCBA as a single-dimensional construct and developed a five-item measurement scale. In addition, some scholars have quantified the concept of WCBA based on a duration perspective (Boswell & Olson-Buchanan, 2007). They measured the construct using the amount of minutes people spend using their computers or phones for work during the day and the frequency with which they use them for work during non-work time. They did this by modifying the Boswell and Olson-Buchanan (2007), scale (Gadeyne et al., 2018). In contrast to this, some scholars have argued that the WCBA should be multidimensional, and by using employees in the marketing department as survey respondents, a two-dimensional scale of frequency and duration was developed (Richardson & Thompson, 2012). In another category, research suggests that WCBA measures need to be attentive to employees' everyday behavioral characteristics (Derks et al., 2014; Fenner & Renn, 2010). For example, within this perspective, Derks and Bakker (2014) developed four entries to measure WCBA, the typical entries being "I use my mobile phone frequently" and "When my mobile phone screen displays a new message, I can't help checking the message" (Derks & Bakker, 2014). The proactive and passive WCBA scores, which were derived from Fenner and Renn (2010),

highlight the impact of individual motivation on work-related connection behaviors. (He et al., 2023). The main measurement scales of the WCBA are summarized in Table 3.

Table 3
Measurement Scale for WCBA

Dimension	Author (Year)	content	Item
One Dimensional	Boswell & Olson-Buchanan, 2007	Frequency	The frequency with which employees use mobile phones, email, voicemail, PDAs, and pagers during non-working hours.
	Fenner & Renn, 2010		Typical Entry "In the evenings or on weekends, I will use my mobile phone, pager, Blackberry phone, or computer at home to complete work-related tasks."
	Park et al., 2011		Frequency of use of a range of work-related communication technologies at home during non-working hours.
	Derks & Bakker, 2014		Typical entry "In the evening, when I have new messages on my phone, I can't help but check them."
	He et al., 2023		When I fall behind in my work during the day, I proactively work hard at home at night or on weekends to get caught up by using my cell phone or computer. I use my computer or cell phone for business-related things only passively after I get home from work.
Two Dimension	Richardson & Thompson, 2012	Frequency and duration	Typical entry: "Time spent using a laptop computer for work-related tasks during non-working hours."
	Gadeyne et al., 2018		Frequency and duration Typical entry: "Frequency of mobile phone/computer use for work during non-working hours."

Relevant Studies of the WCBA

The Antecedents of WCBA

There has been relatively little research into the antecedents of WCBA in existing literature. Organizational and individual antecedents are the two categories into which the antecedents of WCBA can be divided.

The one factor is the organizational antecedents. First, organisational connectivity culture or connectivity norms are the culture or regulations governing the use of communication technologies and equipment by members to process their work (Fenner & Renn, 2010). Symbolic Interaction Theory suggests that both that culture and norms are desired signals that guide team and employee work connectivity behaviors (Schlachter et al., 2017). WCBA is significantly related to the distribution of wirelessly enabled devices by the organization and organizational norms about connectivity (Richardson & Benbunan-Fich, 2011). The workplace norm is a significant factor in WCBA antecedent formation (Li & Yuan, 2018; Richardson & Benbunan-Fich, 2011; Schmoll, 2019). Organizational connectivity norms such as the 24/7 working day (24 hours a day/continuous on-call 7 days a week) implemented by organizations can force employees to have to adopt WCBA as a job requirement (Richardson & Benbunan-Fich, 2011). Second, the organization's distribution of wirelessly equipped gadgets and connectivity are likewise closely linked to WCBA (Richardson & Benbunan-Fich, 2011). The company will let its workers know what is expected of them when it comes to using mobile technology, and it will give them wireless communication devices so they can stay in direct contact with each other even beyond business hours. Employees who buy their own gadgets, on the other hand, won't feel as obligated to link them to the office. Third, segmentation supply is found to have a significant negative correlation with WCBA (F. Wang et al., 2023). Higher segmentation supply can significantly lower WCBA by reducing the permeability of the subordinate work-nonwork barrier (Methot & LePine, 2015). Conversely, organizations with low levels of segmentation supply neglect their subordinates' nonworking lives, increase employee working hours, deteriorate the line separating work from nonwork, and allow work-related issues to interfere with subordinates' nonworking lives. As a result, there are more workplace-related bullying incidents (Metin et al., 2016; Richardson & Benbunan-Fich, 2011). Last, integral parts of the organizational context are job-related characteristics, such as work flexibility and work demands. Higher work flexibility is conducive to connectivity behaviour, while higher job demands such as time pressure on tasks can have a negative impact on connectivity behaviours (Tennakoon et al., 2013).

The other factor is the individual antecedents. First, it is person characteristics, such as polychronicity, responsibility, and role segmentation-integration preference. Schoolar discovered a favorable correlation between an organizational member's polychronicity and WCBA. Compared to their less polychronic counterparts, polychronic individuals were better able to adjust to the email and instant messaging communication environments of their workplace. For example, low polychronics, or monochronics, would only participate in many discussions if they all included the same media, such as IM, but high polychronics were more likely to combine diverse media, such as IM, email, and phone (Richardson & Benbunan-Fich, 2011). It has been argued that employees with high levels of responsibility respond to the organization's connectivity expectation signals and maintain work connectivity behaviour (Ďuranová & Ohly, 2015). There are empirical papers demonstrating that individual segmentation integration preferences are related to WCBA (Richardson & Benbunan-Fich, 2011; Schmoll, 2019; Wang et al., 2023). Boundary theory states that people who have a segmentation preference have limited inter-domain resource mobility and permeability and intentionally draw borders between work and non-work domains, which makes it challenging to adjust to WCBA (Park et al., 2011; Senarathne Tennakoon et al., 2013). Individuals that exhibit integration preferences, on the other hand, favor the engagement of numerous roles

in work-family balance because they are skilled at managing the fusion and penetration of resources in both the work and home domains (Derks et al., 2016).

Second, motivation or demand. Scholars have examined the relationship between an individual's autonomous and controlled motivation and work connectivity behaviours (Ohly & Latour, 2014). According to Self-Determination Theory, work connectedness behaviours are likely to depend on an individual's autonomous motivation (to make choices happily) and controlled motivation (to behave in a certain way in order to avoid punishment or to alleviate feelings of guilt), e.g., autonomous motivation acts as a self-determined resource to satisfy an individual's need to consume psychological resources in the process of work connectedness (Řuranová & Ohly, 2016). Duranova and Ohly (2016), proposed that individuals desire to achieve self-recovery during non-working hours due to physical fatigue and daily stress, and this demand will reduce their work connectivity behaviors (Řuranová & Ohly, 2016).

Third, attitudes related to technology. The degree of a person's own technological innovation will be favorably correlated with WCBA (Richardson & Benbunan-Fich, 2011). At the same time, a study found that communication technology flexibility and use positively influenced their work connectivity behaviour (Diaz et al., 2012).

The Impact of WCBA

On the one hand, WCBA enables employees to maintain flexible work connections, enhances work efficiency and control, and triggers positive psychological experiences and positive work performance; however, the experience also forces individuals to continuously engage in work during non-working hours, which reduces their sense of control and triggers stress, which in turn triggers negative psychological experiences and negative work performance. Therefore, WCBA shows a typical double-edged sword effect (Jiaojiao & Wenhao, 2022). In this paper, the impact of WCBA is analyzed from both positive and negative perspectives.

The Positive Impact of the WCBA

The existing positive effects of WCBA mainly focus on employee work outcomes and personal outcomes.

For personal outcomes, the literature suggests that WCBA predicts individuals' positive affect, resource recovery, and well-being. According to Ohly and Latour's (2014) research, self-directed, motivation-driven electronic communication connected to work and outside of regular business hours can help people disengage psychologically, recoup their resources, and experience positive affect. The use of ICTs not only removes spatial barriers and allows for greater work flexibility, but also provides individuals with access to technological resources (Xiaojuan Ou et al., 2013). WCBA not only helps to satisfy the individual's need for competence, i.e., to help him/her complete work tasks effectively during non-work time, but also fulfils the individual's need for autonomy, i.e., the flexibility to take control of his/her work content and progress. In addition, through WCBA, individuals will also achieve interpersonal interactions and communication with their colleagues or leaders, thus fulfilling their relational needs (Ohly & Latour, 2014). The fulfilment of competence, autonomy, and relational needs often triggers positive emotions and facilitates the individual's psychological disengagement and resource recovery. The findings of Butts et al (2015) also suggest that non-work time and work-related electronic communication with a positive affective tone

stimulate positive emotions, such as happiness, in individuals. Simultaneously, autonomy—which denotes the capacity to manage the nature and course of work—also enables people to psychologically step back from their jobs in a flexible manner and enjoy improved wellbeing (Ohly & Latour, 2014; Richardson & Thompson, 2012).

For work outcomes, the literature suggests that WCBA predicts work control, work autonomy, initiative behavior, work engagement, opportunity focus, work performance, problem solving pondering, innovative behavior, work-to-family enrichment, and work performance. Researchers have discovered that communication technologies let workers connect with their job and obtain more autonomy over it despite time and location constraints. This increases workers' productivity and sense of control over their work (Richardson & Thompson, 2012; Xie et al., 2018). At the same time, it can help employees integrate multiple roles and balance work and family demands, such as receiving important work information while accompanying family members and fulfilling family role requirements, as well as responding quickly to work requirements and promoting work–family enrichment (Yang et al., 2022). WCBA increases flexibility and triggers the individual's autonomous motivation to deal with challenges, thus stimulating employees' work autonomy, work engagement, and initiative behaviour. Related to this, WCBA provides employees with access to additional work resources, satisfying their psychological needs and helping to trigger problem-solving pondering (Chen & Zou, 2023). WCBA can positively predict emphasis on opportunities since workers who use ICTs after hours are better able to complete job duties and have more time for other work. This could lead to their perceiving more possibilities in the future (Shi et al., 2018). In addition, WCBA promotes the progress of work objectives by giving employees access to more work resources and increasing the focus on opportunities (Shi et al., 2018), which will stimulate innovative behaviours. Some scholars have also confirmed that WCBA can improve work performance to a certain extent (Ren et al., 2022).

The Negative Impact of the WCBA

The existing negative effects of WCBA mainly focus on employee personal outcomes and work outcomes.

For personal outcomes, Existing literature suggests that WCAB is associated with individual psychological detachment, ego depletion, psychological distress of employees, fatigue, stress, mood, and quality of life, and bedtime procrastination. There were notable cross-level interactions, such that for those with lower levels of scheduling autonomy, smartphone use for work was favorably correlated with mood and negatively correlated with reported stress. Firstly, Several previous research have demonstrated a negative correlation between an individual's psychological detachment and using work-related electronic communication during non-work time (April Yue, 2022; Mellner, 2016; Park et al., 2011; Zhang et al., 2023). This is because when an individual engages in work activities outside of hours, their work-related psychological and physiological systems are activated, and this state not only hinders the individual's immediate psychological disengagement but also creates cognitive habits and negatively affects subsequent psychological detachment (Derks & Bakker, 2014). Effective psychological detachment can help individuals escape from stress, whereas ineffective or blocked psychological detachment is detrimental to an individual's health (Sonnentag, 2012). Secondly, WCBA often leads to individual depletion due to the large amount of encroachment on an individual's resources (Derks & Bakker, 2014; Ferguson et al., 2016). When WCBA is prevalent, on the one hand, the quantity and quality of an individual's sleep will be affected, thus preventing the recovery of his or her resources and triggering depletion (Park et al.,

2021). Expanding empirical studies have indicated that mandatory work-related smartphone use during non-working hours is associated with reduced employee satisfaction and reduced degrees of detachment and recuperation. This is because working hours divert time from family relationships and work-related stress relief, thereby adversely affecting faculty members' quality of life (Elshaer et al., 2024). There were notable cross-level interactions, such that for those with lower levels of scheduling autonomy, smartphone use for work was favorably correlated with mood and negatively correlated with reported stress (Van Fossen et al., 2023). Research by Lanaj et al (2014), demonstrated that using a cell phone for professional purposes at night severely disrupts a person's sleep and causes depletion the next day (Lanaj et al., 2014). On the other hand, Moreover, WCBA that infiltrate non-work domains can cause people to engage in self-control mechanisms that deplete their resources (Gombert et al., 2018). The influence of WCBA on ego depletion was shown to depend on the reason for engaging in WCBA, according to the study. When employees participated in WCBA as a result of external goals and internal pressure, this effect was more noticeable (i.e. controlled motivation). Furthermore, when WCBA was low or high, workers with restricted motivation typically experienced greater ego depletion than those with autonomous motivation (R. Wang et al., 2023). Lower detachment can cause individuals to constantly exhaust their mental and physical resources, which can eventually result in personal fatigue (Lee et al., 2021). Furthermore, Extended working hours and a heightened burden resulting from work-related electronic communication during non-working hours can elicit a sense of stress in individuals and provide a range of adverse outcomes. People get more stressed when they are unable to replenish their resources during non-work time, which worsens their emotional condition and ability to function at work (Schieman, 2013). Through work-to-family conflict, the length and frequency of WCBA can positively predict employees' psychological distress. In particular, work-family conflict might rise as a result of WCBA, which exacerbates psychological distress in workers. (Dong et al., 2022). Finally, Electronic communication linked to work during non-work hours can make people feel bad (Becker, 2021; Butts et al., 2015) and emotional exhaustion in individuals (Cheung, 2022b; Liu et al., 2023; Y. Park et al., 2020; Xu et al., 2022). However, Becker et al (2021), also noted that high-intensity off-hours and work-related electronic communication causes individuals to become more anxious. For instance, Butts et al (2015), demonstrated that people who experience longer periods of off-hours and work-related electronic communication become angry. In consequence, the development and accumulation of the aforementioned unpleasant feelings will exacerbate people's emotional exhaustion (Cheung, 2022b; Liu et al., 2023; Y. Park et al., 2020; Xu et al., 2022). Researchers found that self-control depletion played a mediation effect in the favorable relationship between bedtime procrastination and smartphone use related to work during off-peak hours. These results were similar for the Chinese and American samples; however, the probability of self-control depletion was higher in the US when smartphone use connected to off-time work was done after hours (Hu et al., 2022).

For work outcomes: Firstly, existing literature suggests that WCAB are associated with work affect, such as work to home conflict, work to leisure conflict, work to life conflict, work role overload, work-family balance, work burnout, work alienation, job satisfaction, and turnover intention. Secondly, existing literature also suggests that WCBA are associated with work behaviors, such as moral disengagement, time theft, withdrawal behavior, cyberloafing, family role performance, employees' time banditry behavior, job performance, work procrastination, unethical pro-family behavior, and family role performance.

work affect: Numerous empirical studies have shown that the WCBA leads to negative work affect: in the first instance, The work-life balance is eroded by WCBA, which also forces workers to constantly expend physical and mental energy and raises demands on them, including role conflict and workload, so that leads to work-to-home conflict (Derks et al., 2016; Diaz et al., 2012; Dong et al., 2022; Gadeyne et al., 2018; H. Wang et al., 2022; Yang et al., 2022) , work-to-leisure conflict (Wang et al., 2022) , work-to-life conflict (Elshaer et al., 2024) work role overload (H. Wang et al., 2022); lower work-family balance (Chen & Zou, 2023). Secondly, work-family conflict is one type of job demand that can lead to energy fatigue, workplace burnout is a result of this circumstance, and it is detrimental to their mental health (Zhu et al., 2024). Teachers who have a high degree of WCBA report feeling emotionally spent, depersonalized, and performing poorly, which ultimately results in work burnout (Percy & Yang, 2022). The nature of WCBA is often additional or supplementary work, and it is rare to receive explicit compensation from the organizer for that work. For employees, WCBA allows them to take on greater job responsibilities, engage in additional work tasks, and accept more and greater job challenges, but they fail to meet the greater work responsibilities, more work assignments, and greater job challenges, while achieving expectations and rewards that match a better, stronger version of yourself, may also aggravate the level of work alienation that employees experience (Chao & Paojui, 2023). Lastly, the findings demonstrated a negative relationship between WCBA and job satisfaction (Cheng et al., 2022; Cheung, 2022b; Ji-eun et al., 2018; Liu et al., 2023) and higher turnover intention (Ferguson et al., 2016; Tao et al., 2023)

Work behaviours: Firstly, the study discovered that WCBA caused employees moral disengagement, time theft, withdrawal behaviour, cyberloafing, employees' time banditry behaviour, work procrastination, and unethical pro-family behaviour. Secondly, because using ICTs for work-related purposes can use up a lot of resources, people increased their moral disengagement level to make up for the resources used and show more time theft (Xu et al., 2022). Information and communication technology use for work can be seen as both a promoter and an inhibitor of work procrastination, with a U-shaped effect (Li et al., 2023). Thirdly, WCBA increased work withdrawal behavior and increased work stress. WCBA led to work withdrawal behavior through work pressure (Wei & Peishan, 2023). Researchers found that WCBA improves work alienation and psychological distress and that psychological distress and work alienation mediated the association between WCBA and workers' subjective well-being (Li et al., 2023). ego depletion

Moreover, WCBA enhanced employees' ego depletion, and employees' ego depletion can lead to abnormal or unethical behavior (Lin et al., 2016). Employees that feel depleted often turn to less obvious and milder production deviance, such as cyberloafing, as opposed to more obvious types of deviant conduct, like personal aggressiveness (Wang et al., 2023). Furthermore, work-family conflict could cause WCBA to implicitly encourage unethical pro-family behavior among employees in addition to actively promoting it (Liu et al., 2024). Lastly, our results mainly supported the notion that for employees who prefer work and family roles to be segmented, the smartphone has the potential to contribute to increasing work-family conflict and less family role performance (Li et al., 2023). Percy and Yang (2022), discovered that WCBA negatively impacted instructors' task and relational performance. In addition to impairing task performance and teaching quality, high levels of WCAB also decreased the

likelihood that teachers would practice organizational citizenship activities and negatively impacted their relational performance (Percy & Yang, 2022).

The Mechanism of Action of WCBA

The Mediating Variables of the WCBA

According to the literature review, the mediating mechanisms of WCBA's effect on dependent variables are mainly based on psychological state factors, work condition factors, and work-family related factors.

Psychological state factors: psychological detachment (Rivkin et al., 2014), emotional exhaustion (Cheung, 2022a; Liu et al., 2023), ego depletion (R. Wang et al., 2023), psychological distress (Xu et al., 2022), self-control depletion (Hu et al., 2022), moral disengagement (Xu et al., 2022), intrinsic motivation (self-efficacy, enjoyment) (Liao et al., 2024), state mindfulness (Wu et al., 2024), state of being recovered (Lei & Su, 2019), recovery experiences (Zhang et al., 2021), and emotional labor (surface acting) (Ji-eun et al., 2018) mediated the relationship between independent variables and dependent variables.

The term psychological detachment describes a person's ability to remain unaffected by and stop thinking about work-related issues after work (Rivkin et al., 2014). Work-leisure conflict may benefit from WCBA if it results in modifications to each person's psychological detachment. People with low psychological detachment are preoccupied with their work, which takes up their time and mental energy and keeps them from engaging in leisure activities. This results in a conflict between work and leisure (F. Wang et al., 2022). Employee fatigue was positively correlated with after-hours work-related ICT use through psychological detachment (Lee et al., 2021). Researchers found that the association between WCBA and job satisfaction was partially mediated by emotional exhaustion (Cheung, 2022a; Liu et al., 2023). The association between work-related ICT-use and time theft is mediated by emotional exhaustion and moral disengagement, respectively, these two variables also have a chain-mediating effect in the relationship mentioned above (Xu et al., 2022). Moreover, the connection between cyberloafing and WCBA is mediated by ego depletion. It is known that WCBA causes ego depletion, which in turn causes cyberloafing. Researchers have also discovered that passive connectivity practices can cause employees' egos to diminish, which in turn lowers family harmony (R. Wang et al., 2023). Because work-related smartphone use during off-peak hours depletes employees' self-control, self-control depletion mediates the effect of after-hours smartphone use on bedtime procrastination. Workers who experience self-control depletion would not have the resources to restrain themselves, which would lead to bedtime procrastination (Hu et al., 2022). The association between WCBA and employees' time banditry conduct is mediated by psychological suffering (Xu et al., 2022).

Liao et al (2024), report that the link between intrinsic motivation (enjoyment, self-efficacy) and work-related digital interaction during nonwork time is an inverted U, job procrastination and the U-shaped association between job-related use of ICTs beyond work hours are mediated by intrinsic motivation (self-efficacy, enjoyment) (Liao et al., 2024). The findings showed a positive relationship between COVID-19 event strength (i.e., event novelty, disruption, and criticality) and the usage of ICTs for work-related purposes after work hours. In the meantime, state mindfulness is inversely correlated with COVID-19 work-related ICT use beyond work hours; so, state mindfulness mediates the relationship between COVID-19

W ICTs and COVID-19 event strength (Wu et al., 2024). There was evidence of a spillover process whereby workers' use of ICTs for work-related purposes beyond work hours was linked to their emotional weariness related to their jobs, and this relationship was mediated by their experience with recovery (Zhang et al., 2021). The findings demonstrated that the state of being recovered acted as a mediating factor in the association between job-related use of ICTs beyond work hours and vigor, a measure of work engagement (Lei & Su, 2019). Using a smartphone for work-related purposes after hours raises surface acting to a superior level, and both surface acting and such uses lower job satisfaction. Furthermore, job happiness and smartphone use connected to work after hours are mediated by surface acting to the supervisor (Ji-eun et al., 2018).

Work condition factors: work autonomy (Yang et al., 2023; Zhu et al., 2024), work stress (Wei & Peishan, 2023), job burnout (Wei & Peishan, 2023), work alienation (Xu et al., 2022), work role overload (Wang et al., 2022), work schedule (Xie et al., 2018), location control (Xie et al., 2018), work engagement (Chen, 2019) mediated the relationship between independent variables and dependent variables.

Firstly, In the relationship between work autonomy and job burnout as well as the relationship between work autonomy and work engagement, work autonomy acts as a mediator, according to the study, work autonomy can increase work engagement and decrease burnout based on the aforementioned factors and the viewpoint of job resources (Yang et al., 2023). A high degree of WCBA causes instructors to feel emotionally exhausted, depersonalized, and to perform poorly on the job. Job burnout, on the other hand, partially mediates the association between WCBA and job performance (Percy & Yang, 2022). Researchers discovered that the daily use of a leader's smartphone for work-related purposes bolstered the beneficial effects of followers' daily use of similar devices for work-related purposes on daily work engagement after work, which in turn had an impact on daily work-family conflict (Chen, 2019). Secondly, work stress mediates WCBA and employees' withdrawal behaviours, WCBA can increase work stress; work pressure can increase work withdrawal behaviour (Wei & Peishan, 2023). A study found that WCBA reduces psychological distress and work alienation. The association between WCBA and employees' time-bandit behavior is mediated by psychological distress and work alienation (Xu et al., 2022). Lastly, according to a study, using ICTs for work-related purposes had a beneficial impact on employees' perceptions of their own job role overload, which increased work-family conflict (Wang et al., 2022). The moderating influence of work-home integration preference on the association between job-related use of ICTs and emotional exhaustion was mediated by work schedule and location control. Specifically, the indirect effect of work-related use of information and communication technologies on emotional exhaustion via work schedule and location control can be stronger for individuals with higher work-home integration preference (Xie et al., 2018). *Work-family related factors:* work-family enrichment (Elshaer et al., 2024; Liu et al., 2024; Yang et al., 2022) and work-family conflict (Yang et al., 2022) mediated the relationship between independent variables and dependent variables.

The effect of work-family enrichment on thriving at work is "double-edged," meaning that it can have a beneficial impact on thriving at work and a negative impact on work-family conflict (Yang et al., 2022). The lines between work and family are increasingly blurred; some people even consider work-family conflict to be a reasonable trade-off for pursuing their professional

goals. People may use ethical rationalization in an effort to put their own interests ahead of those of the organization. Work-family conflict mediates the positive association between WCBA and unethical pro-family behavior because they aim to find a balance between resource gains and losses, which in turn leads them toward employees' unethical pro-family behavior (Liu et al., 2024). The results of the study show that work-family conflict and the usage of smartphones for work-related purposes when off the job have a substantial and detrimental influence on faculty members' quality of life (Elshaer et al., 2024).

The Moderating Variables of the WCAB

In addition to exploring the mediating mechanisms of WCBA on outcomes, studies have introduced different moderating variables to further explore the boundary conditions under which WCBA works, specifically individual difference variables (psychological entitlement, motivations, proactive personality, segmentation preference, work-home integration preference, work-family centrality and affective commitment.) and work context variables (perceived organizational support, organization-based self-esteem, workplace status, organizational politics, workplace status, organizational identity, abusive supervision, work scheduling autonomy, responsiveness from superiors, leader workaholism, workaholism, pay fairness perceptions (fair distribution, procedural fairness, interactive fairness), social support (supervisor support, peer support), workplace telepressure, off-job control (ojc).

Individual difference variables: psychological entitlement (Cheng et al., 2022), motivations (R. Wang et al., 2023), proactive personality (Wei & Peishan, 2023), segmentation preference (Derks et al., 2016), work-home integration preference (Xie et al., 2018). affective commitment (Lee et al., 2021), role pressure (Percy & Yang, 2022), family motivation (Liu et al., 2024) and work-family centrality (Shi et al., 2018).

The findings indicated that perceived organizational support had the potential to moderate the negative link between WCBA and work satisfaction. Additionally, psychological entitlement exacerbated this association, and the aggravating effect was more pronounced when there was no perceived organizational support (Cheng et al., 2022).

Ego depletion was used to imply a connection between WCBA and cyberloafing. Nevertheless, WCBA had less of an impact on ego depletion when it was motivated by high autonomous and low controlled motivation, which lessened the ego depletion's mediating effect (R. Wang et al., 2023). Proactive personality negatively moderates the relationship between work stress and job withdrawal behaviour. When proactive personality is strong, the relationship between work stress and job withdrawal behaviour is weaker, and when proactive personality is weak, the relationship between work stress and job withdrawal behavior is stronger (Wei & Peishan, 2023). Work-family conflict plays a somewhat mediating function in the association between work-related smartphone use in the evenings and family role performance, which is moderated by segmentation preference. For integrators, using a smartphone for job-related purposes after work is associated with better family role performance, which is mediated by less work-family conflict (Derks et al., 2016).

Work-home integration preference will act as a moderator in the positive relationship between work-related use of ICTs, work schedule, and location control. This means that the relationship will be stronger for individuals who have a higher preference for work-home

integration than for those who have a lower preference (Xie et al., 2018). The findings indicated that employees' attention to opportunities was positively correlated with their usage of ICTs for work-related purposes after hours. Furthermore, the effect was greater for employees with high work-family centrality because the positive relationship was diminished by this factor (Shi et al., 2018). The negative association between psychological detachment and the use of ICTs for work can be moderated by affective commitment, meaning that the negative relationship will be stronger for those with higher affective commitment. (Lee et al., 2021). The positive relationship between work-related use of ICTs after hours and fatigue mediated by psychological detachment will be stronger for individuals with higher affective commitment (Lee et al., 2021). WCBA's negative impact on job performance through job burnout is positively moderated by role pressure because role stress can exacerbate the vortex of resource loss caused by work connectedness behaviour after hours, leading to a significant increase in burnout (Percy & Yang, 2022).

Family motivation not only positively moderated the relationship between work-family conflict and unethical pro-family behaviour; the higher family motivation is, the stronger the positive effect of work-family conflict on unethical pro-family behaviour can be. But also family motivation positively moderated the way in which work-family conflict mediates the link between WCBA and immoral pro-family behaviour, the strength of the mediating effect of work-family conflict on the relationship between WCBA and unethical pro-family behaviour is contingent upon the level of family motivation (Liu et al., 2024).

Work context variables: perceived organizational support (Cheng et al., 2022; Liu et al., 2023; Liu et al., 2023); organization-based self-esteem (Li et al., 2023); workplace status (Yang et al., 2023); organizational identity (Liu et al., 2024); abusive supervision (Wu et al., 2024); responsiveness from superiors (Zhu et al., 2024); leader workaholism (Dong et al., 2022); pay fairness perceptions (procedural fairness, interactive fairness) (Chao & Paojui, 2023); perceived organizational politics social (Park et al., 2020); support (supervisor support, peer support) (Park et al., 2020); workplace telepressure (Van Laethem et al., 2018); and off-job control (Elshaer et al., 2024).

The findings indicated that perceived organizational support had the potential to moderate the negative link between WCBA job satisfaction. Additionally, psychological entitlement exacerbated this association, and the aggravating effect was more pronounced when there was no perceived organizational support (Cheng et al., 2022). Information and communication technology use for work-related purposes and emotional tiredness were moderated by perceived organizational support. Particularly, kindergarten teachers who felt little organizational support experienced emotional weariness more when using W ICTs (Liu et al., 2023). According to a study, when there is a low level of perceived organizational support, the use of ICTs for work-related purposes has a greater tendency to promote emotional exhaustion than when these levels are high (Xu et al., 2022). Employees' organization-based self-esteem moderates the mediating effect of psychological distress between WCBA and time banditry behaviour; that is, employees with higher organization-based self-esteem have a significantly lower indirect effect of WCBA via psychological distress on employees' time banditry behaviour than employees with lower organization-based self-esteem (Li et al., 2023).

The positive impact mechanism of work connectivity behaviour after hours on work engagement is moderated by one's workplace status; managers explain this relationship through work autonomy, while regular employees explain it through emotional exhaustion. (Yang et al., 2023). Organizational identity not only negatively moderated the relationship between work-family conflict and unethical pro-family behaviour, the stronger the organization's identity, the less significant the correlation may be between work-family conflict and unethical pro-family behaviours. But also the relationship between work-family conflict and unethical pro-family behaviour is negatively moderated by organizational identity; the stronger the organizational identity, the less mediated the relationship between work-family conflict and unethical pro-family behaviour is (Liu et al., 2024). The relationship between social support (supervisor and peer support) and sense of organizational politics can moderate the strengthening effect of work-related smartphone use after work on job burnout (Park et al., 2020). The association between state mindfulness and COVID-19 event novelty disruption and criticality is moderated by abusive supervision; the relationship is stronger when abusive supervision is less prevalent (Wu et al., 2024).

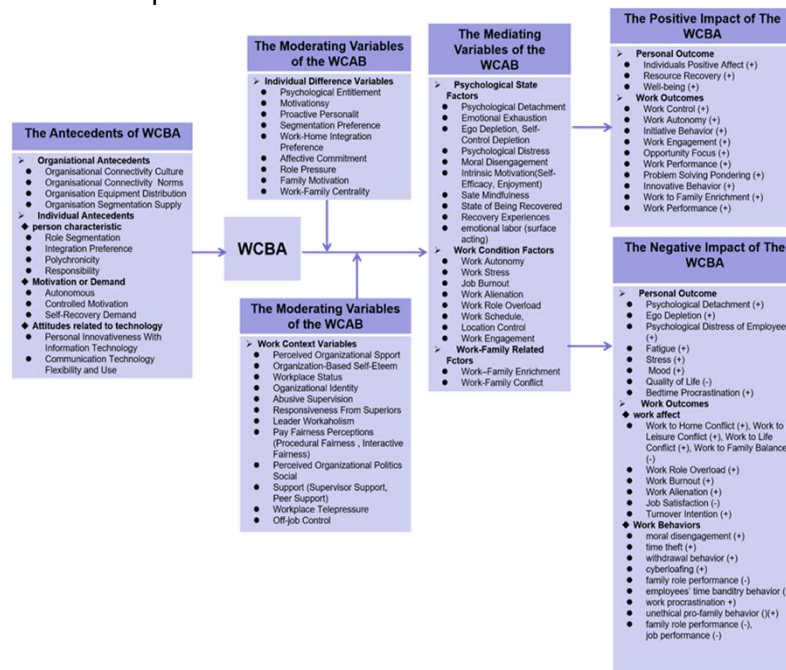
Superiors' responsiveness moderated the relationship between WCBA and autonomy and between WCBA and conflict. It also moderated the effects of autonomy and conflict (Zhu et al., 2024). The phenomenon of leader workaholism has the potential to exert a detrimental moderating influence on the relationship between work-to-family conflict and work-to-family conflict-related psychological distress. Furthermore, it can also serve to moderate the mediating effect of work-to-family conflict on the aforementioned relationship. These findings contribute to the growing body of research elucidating the deleterious impact of workaholism in the workplace and the pivotal role it plays in the relationship between work-to-family conflict and psychological distress among employees (Dong et al., 2022). The pay fairness perceptions (procedural fairness and interaction fairness) have a negative moderating effect on the relationship between off-hours work connectivity and work alienation (Chao & Paojui, 2023). Daily work-related smartphone use during work is negatively related to daily work engagement for individuals experiencing high workplace telepressure (Van Laethem et al., 2018). Off-job control not only moderated the impact of work-related mobile internet usage during off-job time on work-family conflict, but also off-job control moderated the effect of work-family conflict on quality of life (Elshaer et al., 2024).

Conclusion and Research Prospect

Through an in-depth review of the existing literature, it is found that although the connotation, dimensions and measurement of WCBA have been defined, and scholars have achieved some key results in their theoretical and empirical discussions. Such as WCBA enables employees to maintain flexible work connections, enhances work efficiency and control, and triggers positive psychological experiences and positive work performance. However, the experience also forces individuals to continuously engage in work during non-working hours, which reduces their sense of control and triggers stress, which in turn triggers negative psychological experiences and negative work performance. Consequently, WCBA exhibits a double-edged sword effect (Jiaojiao & Wenhao, 2022).

The fragmented character of the study results means that there isn't a systematic analytical framework for efficiently integrating and expanding the existing research results. Therefore, this paper extracts an integrated analytical framework from the three aspects of WCBA

antecedents, effects, and mechanisms, combining the individual and organizational dimensions (see Figure. 1), and reviews the existing research results, hoping to provide a holistic direction for the expansion of WCBA research in the future.



Note: “+” denotes enhancement, “-” denotes diminution.

Figure 1 An integrative analytical framework for the current state of WCBA research

This paper finds that existing research is still deficient and future research should focus on the following areas:

First, deepen the theoretical research and further improve the measurement tools of work connectivity behaviour. Previous studies have mostly selected a single-dimensional scale for measuring work connectivity behaviour, which is somewhat one-sided. In fact, work connectivity behaviour is a complex concept with multiple dimensions and sources. Meanwhile, research on this topic spans multiple disciplines, and different scholars have different measurement standards and methods, resulting in sometimes contradictory results and a lack of systematic exploration. Therefore, future research needs to interpret this topic in the context of current corporate scenarios, refine its theories, and develop an integrated multidimensional work connectedness scale to provide theoretical guidance for the formulation of corporate policies related to human resource management on work connectedness.

Second, research on the antecedent mechanisms of work connectivity behaviours should be expanded, with a particular focus on the team and organizational levels. First, external environmental factors such as industry culture have yet to be fully explored (MacCormick et al., 2012). First, external environmental factors, such as industry culture, need to be fully explored (MacCormick et al., 2012). Secondly, organizational factors should be further explored, as the organizational environment is important for the full utilisation of employees' knowledge and skills and the full exploitation of human capital. Furthermore, there is a lack

of exploration of team-level factors (Pérez et al., 2004), such as those related to time management (Fenner and Renn, 2010).

Third, we should improve the research on the outcome mechanisms and boundary conditions of work-linked behaviours, focusing on the output effects at different levels and across levels. Existing research has seldom analyzed the different levels of contexts in which work connectedness can produce either negative or positive effects, and research on this issue is of great significance in answering the question of how to control work connectedness in management practice so as to make it produce positive effects. In addition, future research should further focus on employees' work behaviours, attitudes and performance, with particular attention to team and organizational level factors such as organizational flattening, teamwork and technological innovation (Becker and Sims, 2001).

Fourth, WCBA is based on a dynamic perspective. Almost all of the current literature is based on a static perspective, with scholars exploring work connectivity behaviour only from the same cross-section, and paying little attention to the vertical changes of the variable and its role model on the time axis, so there is a need to further develop related research under a dynamic perspective, such as the formation process of work connectivity behaviour and the development of its relationship with other variables, and to build a model of the dynamic mechanism.

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