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Work-Related Use of Information and Communication Technologies after Hours (W_ICTs) and Emotional Exhaustion: A Mediated Moderation Model

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Highlights

1. Work-Related use of ICTs after hours (W_ICTs) is common in China.

2. W_ICTs is a risk factor of emotional exhaustion for Chinese employees.

3. Preference to integrate work and family roles attenuates the inducing effect.

4. Work schedule and location control is a key mediator of this moderation effect.

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ABSTRACT

Work-related use of information and communication technologies after hours (W_ICTs) has been found to have an extensive and profound influence on employees' work and family lives. In the current study, we examined the effect of W_ICTs on employee emotional exhaustion and investigated the underlying mechanism with two different samples. In Study 1, data from 447 Chinese college counselors showed that W_ICTs was positively associated with emotional exhaustion, but this positive relationship was weaker for individuals with higher work-home integration preference. These findings were replicated in Study 2, using a sample of 340 full-time employees from different companies in different industries in China. Further analyses showed that work schedule and location control mediated the moderating effect of work-home integration preference on the relationship between W_ICTs and emotional exhaustion. These findings provide strong support for the proposed mediated moderation model, and demonstrate the importance of adopting a needs-supplies fit perspective to understanding the influence of W_ICTs.

Keywords: information and communication technology, work-home integration preference, emotional exhaustion, work schedule and location control, needs-supplies fit

Work-Related Use of Information and Communication Technologies after Hours (W_ICTs) and Emotional Exhaustion: A Mediated Moderation Model

1. Introduction

With the development of information and communication technologies (ICTs) over the last decade, work-related use of information and communication technologies after hours (W_ICTs) has become quite common. Nowadays, many employees are able to work anywhere, anytime depending on their preferences. However, this new way of working might affect individuals' work and family lives in both positive and negative ways. Previous findings suggested that W_ICTs is a double-edged sword (Ma, Xie, Tang, Shen, & Zhang, 2016; Ter Hoeven, van Zoonen, & Fonner, 2016). On one hand, W_ICTs can promote the flexibility to meet job demands (Leung, 2011), and it has been found to positively relate to job satisfaction (e.g., Diaz, Chiaburu, Zimmerman, & Boswell, 2012). On the other hand, W_ICTs can also be a job demand that impairs individuals' well-being (e.g., Boswell & Olson-Buchanan, 2007; Derks, van Mierlo, & Schmitz, 2014). Given the widespread use of ICTs and the potential benefits of W_ICTs, it would be neither realistic nor desirable to ban W_ICTs (Sonnentag & Braun, 2013). Hence, it is particularly important to uncover the negative effects of W_ICTs and then develop effective interventions to mitigate them.

In line with this rationale, the current study tested the effect of W_ICTs on emotional exhaustion and investigated its boundary conditions. As a core dimension of burnout, emotional exhaustion has received considerable research attention (e.g., Cropanzano, Rupp, & Byrne, 2003; Grandey, 2003; Wright & Cropanzano, 1998). It has been found that emotional exhaustion is harmful to individuals' physical and mental health (Huang, Du,

Chen, Yang, & Huang, 2011), as well as their work performance (Karatepe, 2013). Although several studies have examined the relationship between W_ICTs and emotional exhaustion, the findings have been inconsistent (e.g. Derks et al., 2014; Reinke & Chamorro-Premuzic, 2014). In the current study, we proposed and empirically tested a mediated moderation model in which the relationship between W_ICTs and emotional exhaustion would be moderated by work-home integration preference, and work schedule and location control would mediate this interaction effect.

2. Hypotheses Development

2.1. W_ICTs and emotional exhaustion

According to Boundary Theory, individuals may actively create and maintain segmented or integrated boundaries between work and family domains (Ashforth, Kreiner, & Fugate, 2000; Clark, 2000). A segmented boundary distinctly defines when and where work and family responsibilities should each be carried out, and helps to simplify and classify the life environment; in contrast, with an integrated boundary work and family domains are overlapping and closely related (Hislop & Axtell, 2011). Because the demands and purposes in work and family domains often differ, an integrated boundary generally leads to negative consequences for employees, such as decreased family satisfaction and increased psychological distress (Chesley, 2005).

ICTs make it possible for individuals to work anywhere anytime (Cavazotte, Lemos, & Villadsen, 2014; Mazmanian, Orlikowski, & Yates, 2013), and to create an integrated boundary between work and family domains (e.g., Chesley, 2005; Duxbury, Higgins, Smart, & Stevenson, 2014; Ma, Xie, Tang et al., 2016). This integrated boundary might have

negative effects on employees, such as emotional exhaustion. Below we will further elaborate why W_ICTs might be related to more emotional exhaustion.

First, W_ICTs helps individuals be available for work by removing temporal and spatial barriers. For example, individuals may receive work-related calls, emails, and text messages when they are having dinner or sleeping. Therefore, W_ICTs may interrupt individuals' family activities and lead to work-to-family conflict (Boswell & Olson-Buchanan, 2007; Butts, Becker, & Boswell, 2015; Derks, Duin, Tims, & Bakker, 2015) that in turn can be positively related to emotional exhaustion (Boles, Johnston, & Hair Jr, 1997; Hall, Dollard, Tuckey, Winefield, & Thompson, 2010; Ma, Xie, & Tang, 2014). Second, W_ICTs provides individuals with an access to other job demands and work-related information (Ragsdale & Hoover, 2016). For example, individuals may have to give work-related feedback or instructions to coworkers during non-work time. This access can result in more time and energy being spent on working or thinking about working, creating a stronger feeling of job demand that might in turn be associated with emotional exhaustion (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Based on the aforementioned argument, we proposed following hypothesis.

H1. W_ICTs will be positively related to emotional exhaustion.

We also want to point out that this hypothesis is in line with the culture of China, where this study was conducted. In China, work ethics are based on family, such that Chinese strive to bring prosperity to their families by working (Yang, Chen, Choi, & Zou, 2000). Thus, working after hours can be viewed as self-sacrifice made for the benefit of the family, as well as a virtue. Further, the cultural norm of collectivism promotes giving priority to the work

role (Aryee, Fields, & Luk, 1999). The availability provided by W_ICTs makes Chinese employees feel as if they can communicate around the clock with their co-workers. Thus, Chinese employees may be more likely than employees in Western countries to receive work-related calls and text messages during non-work hours, and to experience interruptions of non-work activities. Moreover, because W_ICTs provides access to more job demands and work-related information, Chinese employees might have less time to rest or relax. Interruptions of non-work activities and insufficient rest are both potential causes of emotional exhaustion (Demerouti et al., 2001).

2.2. Work-home integration preference as a moderator

Work-home boundary management preference describes a person's personal preference to integrate or segment aspects of work and family domains (Kreiner, 2006). Individuals with high work-home integration preference would like to integrate work and family roles by creating highly permeable boundaries around the family domain, whereas individuals with high work-home segmentation preference would like to keep their work domain separate from their family domain (Derks, Bakker, Peters, & van Wingerden, 2016; Paustian-Underdahl, Halbesleben, Carlson, & Kacmar, 2016). Previous studies found that the fit between work-home boundary management preference and work-home boundary enactments (also referred to as "boundary fit") can directly or indirectly facilitate individuals' work-family balance, promoting mental and physical health as well as better work performance (e.g., Ammons, 2013; Chen, Powell, & Greenhaus, 2009; Kreiner, 2006; Piszczek & Berg, 2014; Rothbard, Phillips, & Dumas, 2005).

For individuals with a higher work-home integration preference, an integrated boundary

can allow resources to be transferred more easily between domains (Greenhaus & Powell, 2006). For these persons, W_ICTs is a form of boundary enactment that can help create and maintain desired work-home integration (Valcour & Hunter, 2005). In other words, as a reflection of work-home boundary enactments (Ma et al., 2016), W_ICTs might help these persons to achieve "boundary fit" (Towers, Duxbury, Higgins, & Thomas, 2006) and gain more flexibility in work schedules and locations. Although an integrated boundary created by W_ICTs may have some negative consequences such as work-to-family conflict (e.g., Boswell & Olson-Buchanan, 2007; Butts et al., 2015; Derks et al., 2015), it also can bring some benefits to individuals with higher work-home integration preference, such as the flexibility of meeting job demands (Leung, 2011). These benefits may help prevent emotional exhaustion. Therefore, we argue that for individuals with higher work-home integration preference, there may be a weaker relationship between W_ICTs and emotional exhaustion than would be seen in individuals with a lower work-home integration preference.

This argument is consistent with the needs-supplies perspective of person-organization fit (Kristof, 1996), which predicts that matches between employees' preferences and organization supplies will be beneficial to employees through reduced conflicts and stress and increased well-being. It has been found that, for individuals with higher work-home integration preference, segmentation supplies are misfits with their work-home boundary management preference (Kreiner, 2006). Because W_ICTs is negatively associated with segmentation norms (Park, Fritz, & Jex, 2011) and segmentation supplies (Derks et al., 2014), W_ICTs would be a fit for individuals with higher work-home integration preference and could potentially reduce their stress (emotional exhaustion in this case). Additionally,

previous studies have found that work-home segmentation preference can aggravate the positive effect of W_ICTs on work-to-family conflict (Butts et al., 2015; Derks et al., 2016). Considering that individuals' work-home boundary management preference is a continuum between complete integration on the one end and complete segmentation on the other end (Ashforth et al., 2000; Clark, 2000), it is also reasonable to predict that work-home integration preference might attenuate the positive influence of W_ICTs on emotional exhaustion. Taken together, we hypothesized:

H2. The positive relationship between W_ICTs and emotional exhaustion will be moderated by work-home integration preference, such that the relationship will be weaker for individuals with higher work-home integration preference than for those with lower work-home integration preference.

2.3. Work schedule and location control as a mediator of the moderating effect

In this section, we propose that work schedule and location control may mediate the interaction effect described above. work schedule and location control is part of the broader concept of job control which is defined as an individual's ability to control his or her own activities and skill usage (Ganster & Fusilier, 1989; Karasek & Theorell, 1990). Previous studies showed that the use of ICTs can minimize communication delays, and is positively related to job control (e.g., Fujimoto, Ferdous, Sekiguchi, & Sugianto, 2016; Golden & Geisler, 2007; Mazmanian et al., 2013). The recent development of ICTs enables more flexibility in work hours, creating a new form of job control—work schedule and location control (Kossek, Lautsch, & Eaton, 2006). It has been found that W_ICTs is related to an increased sense of this type of control (Richardson & Thompson, 2012). However, we believe

that the relationship between W_ICTs and work schedule and location control may vary depending on individuals' work-home integration preference, and below we elaborate our rationales for this position.

As mentioned earlier, W_ICTs can help individuals with higher work-home integration preference to meet their work-home boundary management preference and satisfy their desire to connect to work after hours. Based on the needs-supplies fit perspective (Kristof, 1996), we believe that work schedule and location control may increase when individuals' preferences are met, for two reasons. First, fulfilled strong preference often has positive spillover effects into other aspects of life. For example, it has been empirically found that a fulfilled work-home boundary management preference positively predicted employees' job satisfaction (Kreiner, 2006). In this case, we expect that fulfilled work-home integration preference may be associated with increased work schedule and location control. Second, meeting a high level of desired preference can enhance perceptions of competence and self-worth. As an individual's work-home integration preference is met, it becomes easier to allocate work-home resources as needed. With better allocation and more effective use of job resources, W_ICTs may lead to increased perception of work schedule and location control.

However, individuals with lower work-home integration preference want to engage in family activities, not work, after hours. W_ICTs would be a misfit with their boundary management preference. According to the needs-supplies fit perspective (Kristof, 1996), this misfit may trigger individuals' controlled motivation for W_ICTs. Previous studies have revealed that the motivation behind individuals' W_ICTs affects their outcomes. One qualitative study showed that individuals who are forced to use their converged mobile

devices experience more disadvantages than voluntary users (Matusik & Mickel, 2011). In addition, Ohly and Latour (2014) found that controlled motivation to the smartphone usage in the evening is associated with less positive affect and more negative affect.

Building on these findings, we infer that individuals with lower work-home integration preference may not appreciate the advantages of W_ICTs, such as facilitating information exchange and communication processes. Instead, W_ICTs may have little or no impact on increasing their sense of control over their work schedule and work location. Based on this logic, we propose the following hypothesis:

H3. The positive relationship between W_ICTs and work schedule and location control will be moderated by work-home integration preference, such that the relationship will be stronger for individuals with higher work-home integration preference than for those with lower work-home integration preference.

Previous research suggested that individuals are motivated to seek control over their environment (Greenberger & Strasser, 1986). Based on the theoretical models of burnout, including both the job demands-resources model (Demerouti et al., 2001) and the job-person fit model (Maslach, Schaufeli, & Leiter, 2001), job control is a central resource for individuals regarding their power and freedom in the workplace. A higher level of job control means that individuals have enough skills and time to execute their job tasks, which can further decrease emotional exhaustion. In addition, job control can help individuals to gain other resources at work (Hobfoll, 1989). These resources can further prevent emotional exhaustion.

Supporting this notion, a number of studies (e.g., Hätinen, Kinnunen, Pekkonen, &

Kalimo, 2007; Park, Jacob, Wagner, & Baiden, 2014; Rupert & Kent, 2007) have demonstrated a significant negative relationship between job control and emotional exhaustion. Similarly, as a new form of job control, work schedule and location control may also be negatively associated with emotional exhaustion. Therefore, we expect that the interaction effect of W_ICTs and work-home integration preference on work schedule and location control will carry over to emotional exhaustion. Building on the aforementioned discussion and the above hypotheses, we hypothesized:

H4. work schedule and location control will mediate the moderating effect of work-home integration preference on the relationship between W_ICTs and emotional exhaustion. Specifically, the indirect effect of W_ICTs on emotional exhaustion via work schedule and location control will be stronger for individuals with higher work-home integration preference.

2.4. The current study

The main purpose of this study was to investigate the mechanism of action of W_ICTs on emotional exhaustion, by testing work-home integration preference as a moderator of the relationship between W_ICTs and emotional exhaustion and testing work schedule and location control as a mediator of this moderated effect. We conducted two studies with two different samples to test our hypotheses. Study 1 tested the effect of W_ICTs on emotional exhaustion (Hypothesis 1) and the moderating role of work-home integration preference on this relationship (Hypothesis 2). Study 2 first replicated findings from Study 1, and then further tested whether work schedule and location control mediated the moderating effect of work-home integration preference (Hypotheses 3 and 4). Figure 1 summarizes the

relationships tested in the current study.

[Insert Fig. 1 Here]

3. Method

3.1. Participants

Convenience sampling was used to recruit participants, and the participants' demographic information of the two studies are summarized in Table 1.

Study 1. We sent a survey to 602 college counselors from universities in the central region of mainland China, and received 447 responses (response rate = 74.25%). Two hundred and nineteen (48.99%) of them were women and 228 (50.01%) were men. The mean age of these counselors was 30.85 years old (*SD* = 4.72 years). Most counselors (326, 72.93%) were married.

Study 2. Participants were full-time employees from different companies in different industries from China. Of 437 questionnaires distributed, 340 were returned with usable data (response rate = 77.80%). One hundred and forty-one (41.47%) of them were women and 199 (58.53%) were men. The mean age of these employees was 34.85 years old (*SD* = 5.66 years). Most participants (79.41%) were married. The participants' managerial positions were diverse, including general employees (40.59%), first-line managers (35.88%) and middle/senior managers (23.53%).

[Insert Table 1 Here]

3.2. Measures

3.2.1. W_ICTs

In both Study 1 and 2, W_ICTs was assessed with a three-item scale by Ma, Xie, Tang

et al. (2016). All items were rated on a five-point scale ranging from "never" to "always." An example item is "How often do you use ICTs to connect with related personnel for work purpose after hours?" Responses across the 3 items were averaged, with higher score representing more W_ICTs. This measure was developed in Chinese context and demonstrated good reliability and validity (Ma, Xie, Tang et al., 2016). Cronbach's alpha of this scale was .71 in both Study 1 and 2.

3.2.2. Work-home integration preference

In both Study 1 and 2, work-home integration preference was assessed with a four-item scale of preferences for segmenting work and family (Kreiner, 2006). Based on Boundary Theory, segmentation is the opposite of integration (Ashforth et al., 2000). Therefore, referring to previous studies (e.g., McNall, Scott, & Nicklin, 2015; Paustian-Underdahl et al., 2016), we reverse-coded the items to reflect work-home integration preference. An example item is "I don't like to have to think about work while I'm at home." All items were rated on a five-point scale ranging from "totally disagree" to "totally agree." The responses were averaged across the four items, with higher score reflecting higher work-home integration preference. This measure has demonstrated good reliability and validity in Chinese samples (Ma, Xie, Ma, & Zhang, 2016). Cronbach's alpha of this scale was .86 in both Study 1 and 2.

3.2.3. Emotional exhaustion

In both Study 1 and 2, emotional exhaustion was assessed with a five-item scale developed for the Chinese context by Li and Shi (2003), based on the MBI-GS scale (Schaufeli, Leiter, Maslach, & Jackson, 1996). All items were rated on a seven-point scale ranging from "never" to "every day." Higher scores indicated a higher level of emotional

exhaustion. An example item is "I feel used up at the end of the workday." The mean score of this scale was computed, with higher score representing higher level of emotional exhaustion. This instrument has been widely used in studies of Chinese employees and has demonstrated good reliability and validity (Ma et al., 2014; Tang, Ma, Wang, & Wang, 2010). Cronbach's alpha of this scale was .93 in both Study 1 and 2.

3.2.4. Work schedule and location control

In Study 2, work schedule and location control was assessed with a four-item scale from Richardson and Thompson (2012). This scale was adapted from the job control scale of Kossek et al. (2006). The items were presented as questions in the original scale, but as statements in the adapted version. In the modified version, participants indicated the extent to which they agreed with each statement on a five-point scale ranging from "totally disagree" to "totally agree." Example items are "In my job, I am able to decide on my own about *where* the work is done" and "In my job, I am able to decide on my own about *when* the work is done". Responses across the 4 items were averaged, with higher scores representing stronger work schedule and location control. This measure has demonstrated good reliability and validity in previous studies (Richardson & Thompson, 2012; Ward & Steptoe-Warren, 2013). We used translation and back-translation method to translate the items into Chinese. Cronbach's alpha of this scale was .86 in Study 2.

3.3. Control variables.

Previous studies on burnout showed that employee demographic characteristics, including age, gender, and marital status, are predictors of emotional exhaustion (e.g., Maslach et al., 2001). Hence, in order to minimize issues related to spurious relationships,

age, gender (male = 1, female = 0), and marital status (married = 1, not married = 0) were statistically controlled in hypothesis testing in Study 1 and 2. Additionally, managerial position has been found to positively relate to job control (Lapierre & Allen, 2012). Thus, managerial position (general employees = 1, first-line managers = 2, middle/senior managers = 3) was also included as a covariate in hypothesis testing in Study 2. Participants' managerial position in Study 1 was homogeneous and was not included as a covariate.

3.4. Analysis strategy

We tested all the hypotheses using the SPSS PROCESS macro (Hayes, 2012), a computational tool for tests of moderation and mediation as well as their combination. This versatile modeling tool has been widely used in recent studies (e.g., Goff, Jackson, Di Leone, Culotta, & DiTomasso, 2014; Shoss, Eisenberger, Restubog, & Zagenczyk, 2013; Thomson, Yuki, & Ito, 2015; Xanidis & Brignell, 2016). Specifically, in both Study 1 and 2, we used PROCESS Model 1 to test the hypothesis about the moderating effect (Hypothesis 1 and 2), and to produce the output used to probe and graph the interaction. In Study 2, we used PROCESS Model 8 to test the hypothesis about the mediated moderation effect (Hypothesis 3 and 4). This model produced the output about the indirect effect of the highest order interaction as well as the conditional indirect effects of the independent variable on the dependent variable at higher and lower levels of the moderator. Additionally, in both Study 1 and 2, bootstrap-based bias corrected confidence intervals (95%) for the indirect effects were generated using 5000 iterations of bootstrapping.

4. Results

4.1. Discriminant and convergent validity

Although all the measures in the present study demonstrated good reliability and validity in previous studies, it is still important to determine if these instruments distinct from each other in the current study. Thus, before testing the hypotheses, we assessed the discriminant validity of the focal variable measures using confirmatory factor analysis (CFA). As Table 2 shows, results from Study 1 showed that the hypothesized three-factor model (W_ICTs, work-home integration preference, and emotional exhaustion) in which all items were loaded on their respective latent variable provided a significantly better fit ($\Delta \chi^2 = 1037.87, \Delta df = 3, p < .01$) than the one-factor model. Similarly, the CFA results from Study 2 showed that the hypothesized four-factor model (work schedule and location control, W_ICTs, work-home integration preference, and emotional exhaustion) provided a significantly better fit ($\Delta \chi^2 = 2094.43, \Delta df = 6, p < .01$) than the one-factor model. These results indicated that the measures did capture distinct constructs.

[Insert Table 2 Here]

We also conducted the average variance extracted (AVE) and composite reliability (CR) to further evaluate the convergent validity for each measure. Results from Study 1 showed that the AVE value ranged from .46 to .71, and the CR value ranged from .71 to .93. According to Hair et al. (2010), the recommended value of AVE was .50, and the acceptable value of CR was .70. Although the AVE value of W_ICTs was slightly below 0.5, its CR value was above the recommended value of .70. Taken together, these results indicated adequate convergent validity for each measure in Study 1. Similarly, the measures used in Study 2 also demonstrated good convergent validity, with the AVE value ranging from .50 to .72 and the CR value ranging from .74 to .93. Additionally, in both Study 1 and Study 2,

the square root of each AVE value was greater than the correlation between that construct and other constructs, further confirming the discriminant validity of the hypothesis model constructs.

4.2. Descriptive statistics

Means, standard deviations, and correlations among the focal variables in the two studies are presented in Table 3. In both Study 1 and 2, there was a small to moderate positive correlation between W_ICTs and emotional exhaustion (r = .18, p < .001; r = .16, p < .01, respectively), preliminarily supporting Hypothesis 1. In Study 2, work schedule and location control was positively related to W_ICTs (r = .22, p < .001), and negatively related to emotional exhaustion (r =-.15, p < .01). These results are consistent with the theoretical expectations. Additionally, in both Study 1 and 2, the mean of W_ICTs (3.86 and 3.13 for college counselors and employees from various industries, respectively) was above 3, indicating that most employees in China conducted W_ICTs sometimes.

[Insert Table 3 Here]

4.2. Testing Hypotheses 1 and 2 in Study 1

Hypothesis 1 predicted that W_ICTs is positively related to emotional exhaustion. As Table 4 (Equation 1) shows, W_ICTs positively predicted emotional exhaustion (B = .27, p < .01), supporting Hypothesis 1. Hypothesis 2 suggested that the positive relationship between W_ICTs and emotional exhaustion is moderated by work-home integration preference, such that the relationship will be weaker for individuals who prefer more integration. Table 4 (Equation 2) shows that the interaction effect between W_ICTs and work-home integration preference on emotional exhaustion was significant (B = -.20, p < .05).

Simple slope tests showed that the relationship between W_ICTs and emotional exhaustion was significantly positive (B_{simple} = .42, p < .001, 95% CI = [.19, .64]) when work-home integration preference was low, but not significant (B_{simple} = .07, p > .05, 95% CI = [-.13, .27]) when work-home integration preference was high. Figure 2 shows the interaction plot. Taken together, these results supported Hypothesis 2.

[Insert Table 4 & Fig. 2 Here]

4.3. Testing all hypotheses in Study 2

Study 2 first tested whether findings from Study 1 could be replicated using a more diverse sample. Table 5 (Equation 1) shows that W_ICTs positively predicted emotional exhaustion (B = .22, p < .01). Moreover, Table 5 (Equation 2) shows that the interaction effect between W_ICTs and work-home integration preference on emotional exhaustion was significant (B = -.19, p < .05). Results of simple slope tests showed that the relationship between W_ICTs and emotional exhaustion was significantly positive (B_{simple} = .36, p < .001, 95% CI = [.17, .55]) when work-home integration preference was low, but not significant (B_{simple} = .05, p > .05, 95% CI = [-.14, .25]) when work-home integration preference was high. Figure 3 shows the interaction plot. Taken together, these results show that Study 2 replicated the findings in Study 1 and provided more supports for Hypotheses 1 and 2.

[Insert Table 5 & Fig. 3 Here]

In Study 2 we also tested Hypotheses 3 and 4. Hypothesis 3 predicted that W_ICTs is associated with higher work schedule and location control for individuals with more work-home integration preference. As shown in Table 5 (Equation 4), the interaction between W_ICTs and work-home integration preference positively predicted work schedule and

location control (B = .28, p < .01). Simple slope analyses showed that the relationship between W_ICTs and work schedule and location control was significantly positive (B_{simple} = .47, p < .001, 95% CI = [.27, .68]) when work-home integration preference was high, but not significant (B_{simple} = .04, p > .05, 95% CI= [-.16, .23]) when work-home integration preference was low. Figure 4 shows the interaction plot. These results provided full support for Hypothesis 3.

[Insert Fig. 4 Here]

Hypothesis 4 posited that the moderating effect of work-home integration preference on the relationship between W_ICTs and emotional exhaustion is mediated by work schedule and location control. Results showed that the index of moderated mediation was significant (effect =-.04, 95% CI = [-.10, -.01]). That is, any two conditional indirect effects via work schedule and location control at different values of work-home integration preference are significantly different from each other. More specifically, the mediating effect of work schedule and location control was significant (effect =-.07, 95% CI = [-.15, -.03]) when work-home integration preference was high, but not significant (effect =-.01, 95% CI = [-.05, .03]) when work-home integration preference was low. Further evidence of the mediated moderation effect is seen in the last two equations in Table 5, which show that when work schedule and location control was included in the equation, the relationship between work schedule and location control and emotional exhaustion was significant (B =-.16, p < .01), while the interaction effect between W_ICTs and work-home integration preference became not significant (B =-.15, p > .01). This suggests that the moderation effect of work-home integration preference was fully mediated by work schedule and location control. These

results supported Hypothesis 4.

5. Discussion

In this study, we tested whether work-home integration preference moderated the effect of W_ICTs on emotional exhaustion, and whether work schedule and location control mediated this moderation effect. Results from two studies found that W_ICTs positively predicted emotional exhaustion at low but not at high levels of work-home integration preference. Further, work schedule and location control acted as a key mediating variable. Specifically, the effect of the interaction (between W_ICTs and work-home integration preference) on emotional exhaustion was fully mediated by work schedule and location control. Overall, our findings provide evidence to view W_ICTs as a reflection of work-home boundary integration enactments which might affect employees' emotional exhaustion depending on their work-home integration preference. Taken together, our results extend prior research on boundary fit/misfit (Ammons, 2013; Chen et al., 2009; Kreiner, 2006; Kreiner, Hllensbe, & Sheep, 2009; Piszczek & Berg, 2014; Rothbard et al., 2005), by testing a mediated moderation model of the relationship between W_ITCs and emotional exhaustion.

5.1. Theoretical contributions

Our study contributes to a broader understanding of the effects of W_ICTs. Previous research on W_ICTs has primarily focused on its negative effect on employees' non-work lives (e.g., Boswell & Olson-Buchanan, 2007; Schieman & Young, 2013) or its positive effect on employees' work performance (e.g., Diaz et al., 2012; Richardson &Thompson, 2012). However, the potential negative effects of W_ICTs on other employee work-related outcomes have been largely overlooked. Following the recent trend to examine the negative

influence of W_ICTs on employees' work-related outcomes (e.g., Derks et al., 2014; Reinke & Chamorro-Premuzic, 2014), the current study finds a positive relationship between W_ICTs and emotional exhaustion, helping us gain more understanding on the negative effects of W_ICTs on employees.

Our finding that work-home integration preference moderates the positive relationship between W_ICTs and emotional exhaustion might help us clarify the inconsistent findings in previous research on the relationship between W_ICTs and emotional exhaustion. For example, there is evidence that daily work-related smart-phone use after hours is associated with daily emotional exhaustion (Derks et al., 2014), but there is also evidence showing that work-related email use after hours (namely email access) has no impact on burnout, of which emotional exhaustion is one key dimension (Reinke & Chamorro- Premuzic, 2014). In line with the needs-supplies fit perspective (Kristof, 1996), our results showed that W_ICTs as a reflection of work-home integration enactments was associated with employee emotional exhaustion only when the employee has lower work-home integration preference. For individuals with higher work-home integration preference, W_ICTs has no impact on emotional exhaustion. These findings help us uncover an important boundary condition under which W_ICTs affects employees differentially.

It is worth mentioning that the relationship between work-home integration preference and emotional exhaustion was significantly negative for Study 1 participants (college counselors) but non-significant for Study 2 participants (employees from various industries). One possible explanation for this difference is that the relationship between work-home integration preference and emotional exhaustion may vary depending on integration

demand. A previous study found that individuals with low work-home segmentation preference experienced higher stress than individuals with high work-home segmentation preference, in organizations with more segmentation supplies (Kreiner, 2006). Considering that integration is the opposite of segmentation (Ashforth et al., 2000), it is reasonable to predict that individuals with high work-home integration preference would experience lower stress and then lower emotional exhaustion than individuals with low work-home integration preference, in organizations with more integration demand.

It is important to recognize that some jobs require more W_ITCs than others. Most Chinese colleges and universities require counselors to keep their mobile devices on 24/7 for student access, in order to ensure that students can get access to their counselors for timely help (Ma, Xie, Ma et al., 2016), and thus their job may require more W_ICTs than other jobs. We checked on this possibility in the current study and found that counselors indeed conducted more W_ICTs, compared with employees in industry ($d = 0.73$, $p < .001$). To a certain extent, this indicates that counselors' integration demand might be higher than it is for employees from other industries in the current study. Thus, the association between work-home integration preference and emotional exhaustion would be more negative for counselors than for employees in other industries. However, additional research is needed to test this explanation.

We also found that W_ICTs was associated with employees' work schedule and location control in different ways, depending on their work-home integration preference, and that work schedule and location control is negatively related to emotional exhaustion. Specifically, for individuals with higher work-home integration preference, W_ICTs was

related with an increased perception of control over work schedule and location, which can potentially prevent employees from experiencing emotional exhaustion. However, the relationship was not significant for individuals with lower work-home integration preference. These individuals prefer to engage in their family role after hours, and do not see the advantages of using a smart-phone for work after hours (Duxbury et al., 2014). Similarly, they may not appreciate W_ICTs' advantages in terms of flexibility and connectivity. As a result, they are likely to experience more emotional exhaustion.

Lastly, to our knowledge, this is the first study to examine the relationship between W_ICTs and emotional exhaustion among Chinese employees. According to previous studies, the relative degree of importance attached to family and work varies between Western and Eastern societies, and the compatibility between family and work varies (e.g., Aryee et al., 1999). Given that W_ICTs relates to working behaviors enacted in the family domain, it is not clear whether findings of studies in Western cultures on the consequences of W_ICTs could generalize to employees in China. Although W_ICTs can serve as job resources as well as job demands (Ma, Xie, Tang et al., 2016; Richardson & Thompson, 2012), our study found that W_ICTs might be a potential cause of emotional exhaustion for Chinese employees.

5.2. Practical implications

The findings of the present study have important practical implications. First, examining the effect of work-related use of ICTs on Chinese employees is of practical importance. According to reports by the Chinese government, 95.2 percent of companies in China use computers to carry out business (China Internet Network Information Center, 2016), and the

prevalence rate of phone use is 112.4 percent (Monitoring and Coordination Bureau, 2016). Therefore, it is particularly urgent to uncover and reduce the negative impact of W_ICTs for Chinese organizations and employees. The present study for the first time examined the relationship between W_ICTs and emotional exhaustion, and found that W_ICTs is a potential risk factor of emotional exhaustion for Chinese employees. Thus, organizations and employees should be aware of the potential effect of W_ICTs on emotional exhaustion, at least for certain employees, and appropriate intervention or support programs can be developed.

Second, our results showed that not all individuals would be affected by W_ICTs in the same way, and that individuals with lower work-home integration preference might suffer more emotional exhaustion from W_ICTs. Thus, providing opportunities to match W_ICTs and employee preferences will help mitigate experiences of emotional exhaustion. In addition, Derks et al. (2016) showed that those individuals with higher work-home integration preference could achieve better family functioning via less work-to-family conflict. Hence, individuals with higher work-home integration preference can be more effective when they are provided opportunities for W_ICTs. Taken together, our results suggest that individuals' work-home boundary management preference should be valued in selection, recruitment, and providing integration or segmentation supplies.

Finally, the present study reveals that the effect of the interaction between W_ICTs and work-home integration preference on emotional exhaustion is mediated by work schedule and location control. Thus, for employees with low work-home integration preference, organizations can help them to prevent emotional exhaustion by increasing their sense of

control over their work schedule and location. For example, offering a flexible work schedule or other HR practices facilitating work-home balance might increase employees' perception of work schedule and location control.

5.3. Limitations and future directions

The limitations of the present study need to be considered. First, all focal variables were measured at the same time with a cross-sectional design. Although the order in which the variables were entered in the multivariate analyses was theoretically derived, we cannot rule out alternative causal directions. For example, higher work schedule and location control might lead to more W_ICTs. Hence, longitudinal research is needed to determine the direction of the proposed relationships in the current study.

Second, as our studies used convenience samples, there may be some concerns about the generalizability of our findings. However, it has been suggested that this issue is less of a concern when the central aim of a study is to demonstrate the existence of a phenomenon, as with our study, rather than to reveal the prevalence of a phenomenon (Landers & Behrend, 2015). Additionally, we replicated our findings on the main effect of W_ICTs on emotional exhaustion and the moderating effect of work-home integration preference in two distinct samples. This suggests that our findings might be generalized to the working population in China. Nevertheless, caution should be taken when generalizing our findings to a non-Chinese population, because W_ICTs may be viewed as a welcome self-sacrifice for the benefit of the family by Chinese but not in the same way in other cultures.

Finally, we only examined work schedule and location control as the mediator of the moderation effect of work-home integration preference. However, according to previous

studies, boundary violation or fit may be also related to work-home boundary control (Kossek, Ruderman, Braddy, & Hannum, 2012) and psychological control over nonwork time (Sonnentag & Fritz, 2007). Thus, it would be interesting for future studies to examine whether these forms of psychological control can mediate the moderation effect of work-home integration preference on the relationship between W_ICTs and emotional exhaustion.

6. Conclusion

In summary, this study is an important step forward in investigating the boundary conditions of the relationship between W_ICTs and emotional exhaustion. It shows that work-home integration preference serves as a potential moderator, and the inducing impact of W_ICTs on emotional exhaustion appears to be weaker for employees with higher level of work-home integration preference, pointing out the importance of individual differences on managing work and home boundaries in coping with potential work-home interactions. Moreover, this moderating effect is mediated by work schedule and location control. For employees with higher level of work-home integration preference, W_ICTs might promote stronger work schedule and location control that subsequently affects emotional exhaustion. This mediated moderation model in the present study moves beyond simple moderation and mediation, and provides a deeper understanding of "how" and "why" W_ICTs might affect emotional exhaustion. Despite our findings, we encourage future research to replicate and extend our findings.

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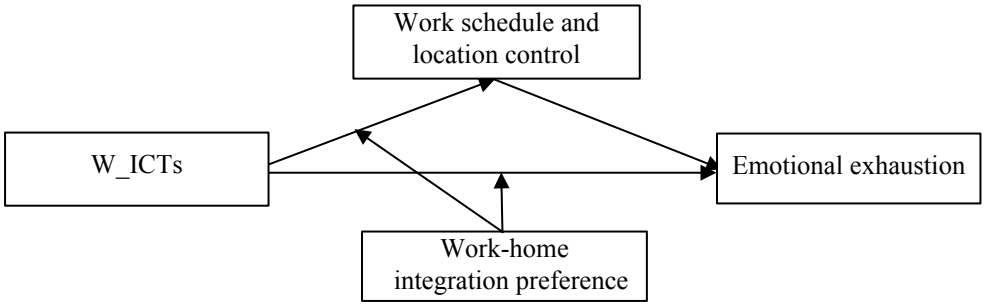

Fig. 1. Overview of the hypothesized mediated moderation model.

Note . W_ICTs, work-related use of information and communication technologies after hours, similarly hereinafter.

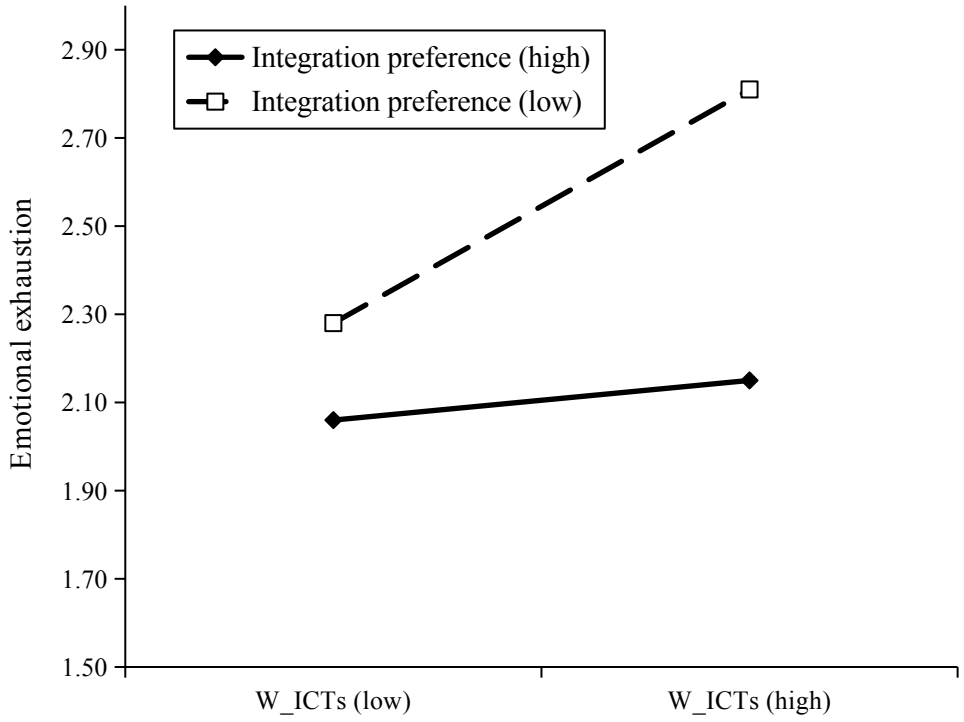

Fig. 2. Moderating effect of work-home integration preference on the relationship between W_ICTs and emotional exhaustion in Study 1.

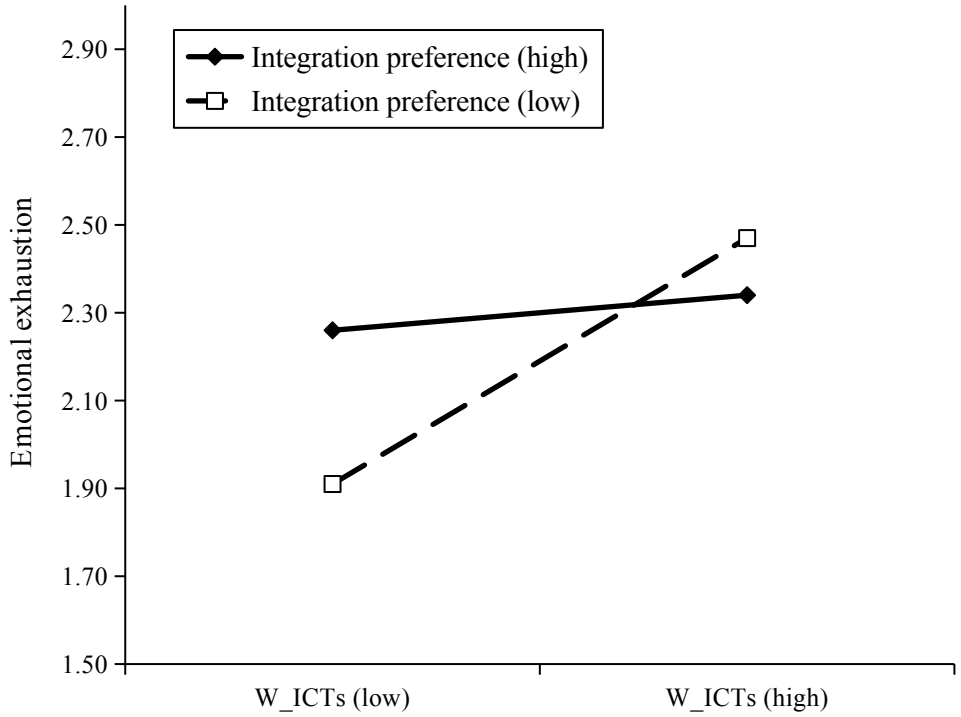

Fig. 3. Moderating effect of work-home integration preference on the relationship between W_ICTs and emotional exhaustion in Study 2.

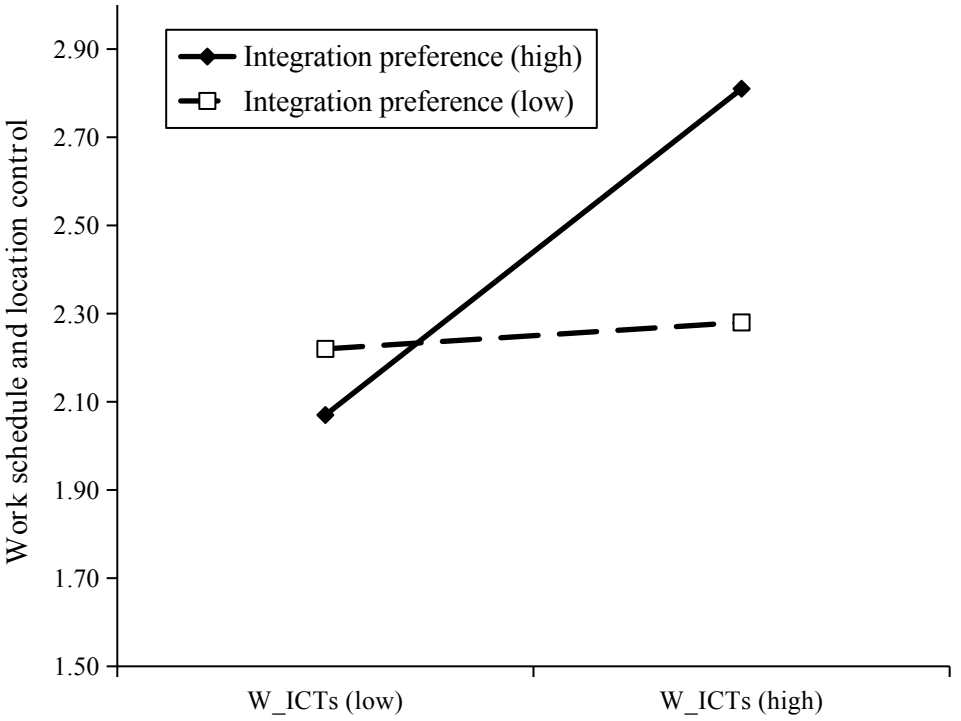

Fig. 4. Moderating effect of work-home integration preference on the relationship between W_ICTs and work schedule and location control in Study 2.

Table 1

Participants' demographic information.

	Study 1		Study 2	
	N	%	*N*	%
Gender				
Male	228	50.01	199	58.53
Female	219	48.99	141	41.47
Age				
20-29	183	40.94	46	13.53
30-39	244	54.59	220	64.71
40-60	20	4.47	74	21.76
Marital Status				
Married	326	72.93	270	79.41
unmarried	121	20.07	70	20.59
Managerial position				
general employees	_	_	138	40.59
first-line managers	_	_	122	35.88
middle/senior managers	_	_	80	23.53

Table 2

Confirmatory factor analysis results.

Models	χ^2	*df*	TLI	CFI	RMSEA	$\Delta\chi^2$	Δdf
Study 1							
Hypothesized three-factor model	237.56	51	.92	.94	.091	—	—
One-factor model	1275.43	54	.50	.59	.225	1037.87**	3
Study 1							
Hypothesized four-factor model	289.90	98	.92	.94	.076	—	—
One-factor model	2384.33	104	.11	.23	.254	2094.43**	6

Note. ** $p < .01$.

Table 3

Means, standard deviations, and correlations among study variables in Study 1 and Study 2.

Variables	*M*	*SD*	1	2	3	4	5	6	7
Study 1 (*n* = 447)									
1. Age	30.85	4.72							
2. Gender	.51	.50	-.02						
3. Marital Status	.73	.45	.51***	-.09*					
4. W_ICTs	3.86	.64	.02	.09	.13**				
5. Work-home integration preference	2.15	.86	.09*	.13**	-.11*	-.14**			
6. Emotional exhaustion	2.34	1.08	.07	.10*	.14**	.18***	-.21***		
Study 2 (*n* = 340)									
1. Age	34.85	5.66	-						
2. Gender	.59	.49	.05						
3. Marital Status	.79	.41	.46***	.03					
4. W_ICTs	3.13	.78	.19**	.13*	.05				
5. Work-home integration preference	2.05	.79	.00	.06	-.14**	.09			
6. Emotional exhaustion	2.24	.96	-.07	.11*	-.10	.16**	.10		
7. Work schedule and location control	2.36	1.04	.18**	-.06	-.03	.22***	.10	-.15**	
8. Managerial position	1.83	.78	.38***	-.04	.12*	.17**	.03	-.10	.17**

Note. W_ICTs refers to work-related use of information and communication technologies after hours, similarly hereinafter.

*$p < .05$, ** $p < .01$, *** $p < .001$.

Table 4

Regression results for moderation effect in Study 1.

Predictors	Equation 1 (Exhaustion)		Equation 2 (Exhaustion)	
	B	*SE*	*B*	*SE*
Age	.00	.01	.01	.01
Gender	.22*	.10	.26**	.10
Marital Status	.31*	.13	.23	.13
W_ICTs	.27**	.08	.24**	.08
Integration preference			-.26***	.06
W_ICTs × integration preference			-.20*	.09
R^2	.06		.11	
ΔR^2			.05***	

Note. n = 447; *$p < .05$, ** $p < .01$, *** $p < .001$.

Table 5

Regression results for moderation effect and mediated moderation effect in Study 2.

Predictors	Equation 1 (Exhaustion)		Equation 2 (Exhaustion)		Equation 3 (Exhaustion)		Equation 4 (Control)	
	B	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*
Age	.00	.01	.00	.01	.00	.01	.03*	.01
Gender	.17	.11	.16	.10	.13	.10	-.19	.11
Marital Status	-.21	.14	-.19	.14	-.23	.14	-.26	.15
Managerial position	-.14	.07	-.13	.07	-.12	.07	.11	.07
W_ICTs	.22**	.07	.21**	.07	.25***	.07	.26***	.07
Work-home integration preference			.07	.07	.09	.07	.12	.07
W_ICTs × work-home integration preference			-.19*	.09	-.15	.09	.28**	.09
Work schedule and location control					-.16**	.05		
R^2	.06		.08		.10		.12	
ΔR^2			.02*		.02**			

Note. n = 340; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.