

# Non-work-related instant messaging in the workplace and daily task performance: complementarity between social and cognitive resources

Non-work-related IM and Task Performance

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## Abstract

**Purpose** – The ubiquity of smartphones has changed how people communicate, work and entertain. In view of conservation of resources theory and the positive spillover effect, this study explores the effect of non-work-related instant messaging (IM) in the workplace on daily task performance.

**Design/methodology/approach** – The authors use the experience sampling method to collect day-level data from 75 employees over a period of 10 workdays. Multilevel path analysis is used to test the hypotheses.

**Findings** – Non-work-related IM exerts a significant negative indirect effect on daily task performance through diminished cognitive engagement. This negative indirect effect disappears when social support is high, thereby showing the function of social support as a neutralizer of the detriment of non-work-related IM on daily task performance.

**Practical implications** – The findings suggest that organizations can neutralize the harm of non-work-related IM in the workplace by promoting social support perceived by employees.

**Originality/value** – This study advances the technology and management literature by developing and testing a balanced perspective on the ambivalent effect of workplace smartphone use that considers social and cognitive resource implications.

**Keywords** Non-work-related instant messaging, Smartphone use during work, Social network service, Perceived social support, Cognitive engagement, Daily task performance

**Paper type** Research paper

## Introduction

The world is at our fingertips. Smartphones make information search, entertainment and social contacts as convenient as possible. The sharp penetration of smartphones and its accompanying addiction has raised a series of challenges for organizations and management, and these issues have even intensified with the global pandemic that increases people's dependence on information technology. The most prevailing concern is the excessive use of smartphones in the workplace, particularly for non-work-related purposes, an occurrence which may distract employees and impair productivity (Elhai *et al.*, 2016). This reservation is not groundless given recent findings that the mere existence of smartphones can affect cognitive ability (Ward *et al.*, 2017) and reduce multitasking performance (Wang and Tchernev, 2012). This study investigates multiple ways through which non-work-related or personal instant messaging (IM) in the workplace affects daily task performance.



Smartphones are personal communication devices, for which IM apps (e.g. WhatsApp, Facebook Messenger and WeChat) are the most frequently used tools. Through IM, employees can remain connected with friends and family members while they work (Wang and Tchernev, 2012). Accordingly, social connotations should be considered to properly evaluate the performance implications of IM aside from the time or cognitive distraction involved. Non-work-related IM during work hours is likely to interfere with the cognitive engagement of employees, thereby decreasing productivity (Ward *et al.*, 2017). However, that IM usage may provide immediate social support from personal contacts; in turn, this support may improve morale and positive energy for employees to continue their work. In this sense, non-work-related IM incurs critical social emotional ramifications, which have been disregarded in the literature.

To address the conflicting potential of non-work-related IM, we draw on conservation of resources (COR) theory which proposes that individuals strive to obtain, retain, foster and protect their personal resources (Hobfoll, 1989). According to the core tenet of COR theory, we posit that non-work-related IM in the workplace should be viewed as a double-edged sword for task performance because it indicates both resource loss and resource gain. The effect of non-work-related IM on task performance is indirect through its positive and negative implications for social and cognitive resources. In terms of cognitive resources, non-work-related IM may distract employees, thereby diminishing task performance through reduced cognitive engagement. Regarding social and emotional resources, however, non-work-related IM can generate emotional resources that leak into the work domain and improve work motivation (Cheng *et al.*, 2019). The theory on positive spillover suggests that emotional rewards provided by non-work activities can spill over into the work domain, such that ample resources from the non-work domain can complement work-related resource deficiency (Edwards and Rothbard, 2000). Thus, we further propose that cognitive and social resources resulting from non-work-related IM may interact, such that the negative effect on task performance through reduced cognitive engagement may be offset by social support that promotes the acquisition of work-related resources through positive spillover (Hobfoll *et al.*, 2018).

This work advances the literature in four important aspects. First, we develop a balanced view of the performance implications of non-work-related IM by veering away from the dominant belief highlighting its dark side. Second, by drawing on COR theory and the positive spillover effect (Halbesleben *et al.*, 2014), we theorize and validate the dual function of non-work-related IM in depleting and acquiring resources in relation to two types of resource (i.e. cognitive and social). Third, the present study complements previous works that mostly focused on technical and time-related factors by examining the potential social and emotional implications of smartphone use at workplaces. Lastly, we apply the experience sampling method (ESM) to reveal day-level unfolding processes using data collected from 75 employees over 10 workdays. The repeated measures of the daily fluctuations of employees' IM use patterns, cognitive and social resources and performance should indicate the real-time, immediate implications of non-work-related IM in the work context (Casper and Sonnentag, 2020).

### **Theory and hypothesis development**

As mobile intellectual terminals, smartphones have become indispensable tools in our work and personal lives. Although smartphones benefit organizations by facilitating professional, functional task activities, non-work-related smartphone usage cannot be fully controlled. We focus on non-work-related IM, which refers to the use of IM apps (e.g. WhatsApp, WeChat and Instagram) by employees during work hours to communicate with friends and family members.

Non-work-related IM is commonly regarded as a work disturbance because its purposes are inconsistent with organizational or task goals (Wiradhany and Nieuwenstein, 2017). In this study, we develop a balanced view of the performance implications of non-work-related IM by considering its resource depletion and acquisition functions. Figure 1 summarizes the current theoretical framework. Given the immediacy of resource changes incurred by smartphone use during work hours, we investigate the day-level effects of non-work-related IM on resources and task performance instead of the effects aggregated over weeks or months.

*Mediation by cognitive engagement*

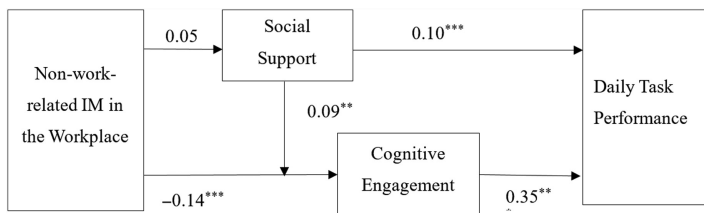
Cognitive resources represent energy that enables individuals to successfully perform cognitive tasks (Hess, 2014). People need cognitive resources to conduct various controlled mental operations, such as attention, situation appraisal, memory update and information processing (Christian et al., 2011). Cognitive resources may manifest in the form of cognitive engagement, which refers to one’s psychological attention and absorption into work (Rothbard, 2001). Cognitively engaged individuals are absorbed in work, and they will thus disregard other factors and be fully immersed in their work by deploying cognitive resources.

The depletion of cognitive resources impairs the attention and energy that can be allocated to task activities (Christian et al., 2011). Specifically, non-work-related IM during work hours may distract employees from their tasks and interrupt the natural flow of task activities. Distracted employees need mental preparation to return to work, which is a cognitive transition that takes substantial resources (Zhu et al., 2019). Therefore, as non-work-related IM depletes the limited mental resources of employees, their cognitive engagement in tasks may decrease. These arguments lead to the following hypothesis:

H1. Non-work-related IM is negatively related to cognitive engagement.

Cognitive engagement represents the deployment of cognitive resources to tasks, a process which enhances productivity and task performance. Employees who are cognitively absorbed in their job are more likely to disregard factors unrelated to the task and less likely to be defeated by problems or challenges they encounter in the course of work (Christian et al., 2011). However, those conducive effects of cognitive engagement may not occur if cognitive resources are used up by distracting non-work-related IM (Wu et al., 2020). Distracted employees may experience difficulties in focusing on current tasks and overcoming obstacles because of deficient cognitive resources (Wang and Tchernev, 2012). Thus, non-work-related IM may decrease task performance on the same day by imposing resource constraints that impair employees’ abilities to complete their work.

H2. The relationship between non-work-related IM and daily task performance is mediated by cognitive engagement.



Note(s): \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Figure 1. Theoretical framework and path analysis results

*Mediation by social support*

Social support is a perception of being loved and cared for or respected and valued by others (Halbesleben *et al.*, 2014). To cope with workplace stress and/or achieve task goals, employees can resort to two sources of social support (Lin *et al.*, 2019): social resources related to work (e.g. support from supervisors and understanding from colleagues) and resources unrelated to work (e.g. intimate relationships with spouses or partners and caring relationships with friends and relatives; Hobfoll *et al.*, 2018). Previous studies demonstrated the positive social motivational implications of high-quality relationships and support from supervisors and coworkers (Rich *et al.*, 2010). In this work, we highlight the social support from non-work-related sources considering the prevalence of social network services (SNS) and IM apps through which people can communicate with others anytime and anywhere. Thus, employees can increasingly pursue and gain social support from their family and friends while they are at work; a situation which intensifies the significance of this type of social resource (Wang and Tchernev, 2012).

We propose that non-work-related IM affects the level of social resources in the form of perceived social support. Hobfoll (1989) stated that “social relations are seen as a resource to the extent that they provide or facilitate the preservation of valued resources” (p. 517). Through IM, employees can pursue and gain social support from friends and family members while they are at work (Elhai *et al.*, 2016). People can fulfill their social needs and promote a sense of belongingness through SNS and IM activities that allow meaningful conversation and empathic understanding (Halbesleben *et al.*, 2014). Accordingly, employees may gain social support by maintaining communication with friends and relatives through non-work-related IM (Casper and Sonnentag, 2020). Thus, we advance the following hypothesis:

*H3.* Non-work-related IM is positively related to social support.

The work–family interface literature suggests that social support from personal relationships outside the work benefits task motivation and various performance outcomes (Zee *et al.*, 2020). The spillover between work and non-work domains occurs when certain aspects of one domain transfer to the other, thereby resulting in a shared or similar mood, motivation and behavior across the two domains (Edwards and Rothbard, 2000). Moreover, emotional spillover occurs when a person’s workplace emotions persist after work or vice versa (Cheng *et al.*, 2019). The family-to-work enrichment perspective claims that positive non-work activities can provide emotional rewards and resources, such as pride and respect, which promote constructive behaviors in the work domain (Booth-LeDoux *et al.*, 2020).

In view of the family-to-work enrichment perspective, we argue that social support obtained from friends and family members provides emotional resources that can spill over into the workplace (Cheng *et al.*, 2019). When employees receive social support from their spouses at home, the social resources spill over to the work domain and foster task engagement, functioning and satisfaction at work (Booth-LeDoux *et al.*, 2020). Through the positive spillover process, social support may expand the pool of resources that can be devoted to work engagement. Therefore, social support from non-work-related relationships can cross the work–family or work–life boundary to improve work-related attitudes and task performance (Booth-LeDoux *et al.*, 2020). Accordingly, employees can gain social resources that help their daily task performance by engaging in non-work-related IM. Hence, we posit the following mediation hypothesis:

*H4.* The relationship between non-work-related IM and daily task performance is mediated by social support.

*Interaction between cognitive engagement and social support*

Thus far, we have proposed the positive and negative indirect effects of non-work-related IM on task performance via social support and cognitive engagement. We further theorize that

the negative indirect effect through cognitive engagement may change depending on the level of social support. The presence of social support may attenuate or neutralize the harm of non-work-related IM by replenishing the loss of cognitive resources through the additional resources spilled over from social resources.

Social support gained from non-work-related IM may help employees cope with the loss of cognitive resources due to non-work-related IM, thereby buffering employees from work stress and exhaustion (Hobfoll *et al.*, 2018). Additional social resources gained from friends and family members spill over to the work domain and invigorate employees to return to their work with renewed energy, enthusiasm and fresh ideas after non-work-related IM (Rubenstein *et al.*, 2013). Those rejuvenation processes may further compensate for the loss of cognitive resources from non-work-related IM and consequently sustain the task engagement level of employees. This compensatory process is possible because personal resources and work engagement are reciprocally related to each other over time (Laguna *et al.*, 2017).

Accordingly, the negative effect of non-work-related IM on cognitive engagement and task performance is likely neutralized when employees acquire social resources from social support. The loss of cognitive resources is countered by the newly acquired social resources that spill over to the work domain and buffer the harm from the resource loss (Booth-LeDoux *et al.*, 2020). By contrast, employees who fail to gain social resources are more vulnerable to the detriment of non-work-related IM that causes resource depletion. In line with COR theory, a lack of resource further intensifies resource depletion (Hobfoll, 1989). In this case, regular work routines and flow are interrupted by non-work-related IM without the acquisition of social resources to recover resource loss, thereby resulting in substantial damage to task performance on the same day. These arguments lead to the following moderated mediation hypothesis:

- H5. Social support moderates the negative indirect effect of non-work-related IM on daily task performance through cognitive engagement, such that the indirect effect is weaker when social support is high than when it is low.

## Method

### *Participants and procedure*

We used the ESM and collected data through online daily surveys. The ESM focuses on evaluating constructs and variables that fluctuate over a short period through repeated measurements of the same individuals as they go about their daily lives (Fisher and To, 2012). This study aims to examine the effect of non-work-related IM of a given day on the task performance on the same day to detect the day-level unfolding process rather than long-term effects or generalized patterns aggregated over time. The ESM is an appropriate method for testing the current hypotheses because individual usage of smartphones for non-work-related IM may have immediate implications for social support and cognitive engagement that immediately affect daily task performance, which may unfold over hours or within the span of a day. To achieve a balance between the quality and reliability of data and statistical power, we followed the recommended practice of collecting ESM data for over two weeks (Matta *et al.*, 2020).

To test the present hypotheses, we used the personal networks of the research team to recruit participants by sending invitation messages to working adults in a major city in China. Once they have signed up, the participants were asked to complete a general survey of their demographic characteristics and other basic information, such as their workload. In the following weeks, we sent a link for short online surveys thrice daily for 10 continuous workdays (Fisher and To, 2012). Each day, the participants received their first daily survey at 8:00 a.m. and were instructed to report their sleep quality for the night before by 11:59 a.m.

The second daily survey was sent at 3:00 p.m. to evaluate the frequency of non-work-related IM during the day, cognitive engagement and social support and was completed before 5:00 p.m. The participants received the third daily survey after work at 6:00 p.m. and were asked to report their task performance of the day before 11:59 p.m.

Initially, 85 participants signed up for our study and completed the general survey a week before the ESM. During the 10-day ESM, 10 participants failed to complete the daily online surveys. Consequently, 75 participants provided valid day-level data for a total of 750 days (response rate = 88%). The current sample of 75 participants was employed full-time with diverse occupations, such as engineers, data scientists, financial analysts and human resource specialists. They worked for different types of employers, including private firms (65%), state-owned enterprises (12%), foreign firms (20%) and others (3%). In this sample, 73% were women, and 86% obtained at least a college degree. The participants' average age was 30.64 years ( $SD = 4.73$ ), and the average working years was 5.46 years ( $SD = 3.58$ ).

### *Measures*

To assess the variables, we utilized published scales from previous studies. Given that the original scales were written in English, the measurement items were translated into Mandarin by a bilingual researcher and back-translated by another researcher.

*Non-work-related IM.* We assessed non-work-related IM in the workplace by asking the participants to rate the frequency of such behavior. The participants were asked how often they chat with non-work personal contacts during the work hours on the given day in the afternoon survey. Specifically, they responded to a question "Today, how often did you chat or exchange messages through instant messaging (e.g. QQ and WeChat) with your friends and family members or relatives during work hours?" using a five-point scale ranging from 1 (not at all) to 5 (very frequently) (Kim *et al.*, 2018).

*Cognitive engagement.* We adopted the measure of cognitive engagement developed by Rich *et al.* (2010). This six-item scale ( $\alpha = 0.96$ ) assesses the level of attention and absorption into one's job. A sample item is "During the past work hours, my mind was focused on my job" (1 = strongly disagree, 5 = strongly agree).

*Social support.* We adopted the three-item measure of the Social Provisions Scale (Cutrona and Russell, 1987) to evaluate social support ( $\alpha = 0.92$ ). As part of the afternoon survey, the participants were asked to rate the extent to which they received guidance, assistance and emotional closeness from friends and family on a five-point scale (1 = not at all, 5 = to a great deal). A sample item is: "Today, to what extent did your close friends or relatives provide you with a sense of emotional security and wellbeing."

*Daily task performance.* We adopted a three-item measure ( $\alpha = 0.94$ ) of individual task performance from Heilman *et al.* (1992). The participants rated their performance of the given day after regular work hours. A sample item is: "Today, at work I performed my job quite well" (1 = strongly disagree, 5 = strongly agree).

*Control variables.* Our analysis included the demographic characteristics of the participants (i.e. sex, age and education) as controls to exclude any confounding effects in our analysis results because of these basic biological traits (Matta *et al.*, 2020). To consider potential organizational contextual effects on IM use patterns, we created firm-type dummies for private, foreign and state-owned firms. Adopting an item from Pittsburgh Sleep Quality Index (PSQI: Buysse *et al.*, 1989), we also controlled for sleep quality reported in the daily morning survey because it tends to hinder work engagement and performance. The item is "How would you rate the quality of your previous night's sleep" (1 = very bad, 5 = very good). We controlled for workload that affect the capability of people to engage in and complete their work. Workload was assessed using a five-item scale in the general survey before the 10-day ESM (Spector and Jex, 1998). A sample item is "How often do you have to do more work than you can do well?" (1 = less than once per month or never, 5 = several times a day).



We conducted the same hypothesis-testing analyses with and without control variables. The results remained the same, thereby showing the robustness of the current analysis results.

#### *Analytical approach*

Given the nested research design (daily reports nested in persons), we conducted multilevel structural equation modeling (MSEM) by using Mplus Version 7 and following the recommendations of Preacher *et al.* (2010) on testing multilevel models. MSEM decomposes the variance of the day-level variables into within- and between-person components, thereby testing the hypotheses by considering the variances attributable to different levels of analysis. The within-person or day-level control (i.e. sleep quality) was modeled at Level 1, and the between-person controls (i.e. sex, age, education, firm type and workload) were modeled at Level 2.

### **Results**

We conducted a multilevel confirmatory factor analysis (MCFA) to examine the hypothesized four-factor model (i.e. workload, social support, cognitive engagement and task performance). Given the relatively small sample size, we created two-item parcels for cognitive engagement by randomly assigning six items to achieve an adequate ratio of the sample size to the number of parameters to be estimated (Sass and Smith, 2006). The four-factor measurement model demonstrated good fit with the data ( $\chi^2(106, 75) = 4727.89, p < 0.001, CFI = 0.91, SRMR (within) = 0.03, SRMR (between) = 0.04$ ) and significantly outperformed any alternative three- or two-factor models (all  $\Delta\chi^2$  tests,  $p < 0.001$ ). The MCFA results support the discriminant validity of the current study variables. Table 1 presents the means, standard deviations and intercorrelations among the variables.

#### *Main and indirect effects of non-work-related IM*

Table 2 presents the results of our multilevel path analysis, in which the significance of the hypothesized paths was evaluated. Hypotheses 1 and 2 proposed that non-work-related IM is negatively related to cognitive engagement which, in turn, mediates the relationship between non-work-related IM and daily task performance. Model 1a of Table 2 shows that the relationship between non-work-related IM and cognitive engagement was statistically significant and negative ( $b = -0.11, t(66) = -5.01, p < 0.001$ ). Thus, Hypothesis 1 is supported.

We tested the mediation hypothesis following the recommendations of Preacher *et al.* (2010). The multilevel path analysis revealed that cognitive engagement was a significant predictor of daily task performance ( $b = 0.39, t(64) = 10.73, p < 0.001$ , Model 1b, Table 2). In addition, the day-level indirect effect of non-work-related IM on daily task performance through cognitive engagement was significant and negative ( $b = -0.04, t(64) = -4.54, 95\%$  confidence interval (CI)  $[-0.06, -0.03]$ ). That is, a one-unit (i.e. 1 SD) increase in non-work-related IM is related to a 0.11 unit decrease in cognitive engagement, which is related to a 0.36 unit reduction in daily task performance, thereby producing the indirect effect of 0.04 unit decrease in daily performance. Hence, Hypothesis 2 is confirmed.

Hypotheses 3 and 4 suggested that non-work-related IM is positively related to social support which, in turn, mediates the relationship between non-work-related IM and daily task performance. As reported in Model 2a of Table 2, the relationship between non-work-related IM and social support was not significant ( $b = 0.05, t(66) = 1.76, p = 0.08$ ). To test the indirect effect via social support, we examined the effect of social support on daily task performance,

**Table 1.**  
Mean, standard deviation and correlation among study variables

	M	SD <sup>a</sup>	SD <sup>b</sup>	1	2	3	4	5	6	7	8	9	10	11	12
1. Sex <sup>a</sup>	1.72	-	0.45	-											
2. Age <sup>a</sup>	30.76	-	4.75	-0.08*	-										
3. Education <sup>a</sup>	3.17	-	0.64	-0.16*	-0.23**	-									
4. Private company <sup>a</sup>	0.65	-	0.48	0.11**	0.20**	-0.15**	-								
5. Foreign company <sup>a</sup>	0.20	-	0.40	0.16**	-0.14**	-0.03	-0.69**	-							
6. State-owned company <sup>a</sup>	0.12	-	0.33	-0.32**	-0.10**	-0.16**	-0.51**	-0.19*	-						
7. Workload <sup>a</sup>	2.97	-	0.59	-0.04	0.02	0.06	0.19**	-0.17**	-0.08*	-					
8. Sleep quality <sup>b</sup>	3.24	0.86	0.47	-0.17	0.22	0.21	0.1	-0.12	-0.05	0.07	-		0.07*	0.11**	0.09*
9. Non-work-related IM <sup>b</sup>	2.24	0.93	0.61	-0.23*	-0.07	-0.23*	0.07	-0.15	0.08	-0.13	0.15	-	0.13**	-0.17**	-0.07
10. Social support <sup>b</sup>	3.39	0.75	0.51	0.07	-0.13	0.11	-0.01	0.07	-0.02	0.13	0.12	0.19	-	0.39**	0.37**
11. Cognitive engagement <sup>b</sup>	3.75	0.62	0.47	0.34**	0.06	-0.02	0.00	0.13	-0.13	0.22	0.11	-0.16	0.58**	-	0.62**
12. Task performance <sup>b</sup>	3.82	0.63	0.48	0.22	0.00	-0.10	-0.03	0.19	-0.11	0.04	0.09	-0.06	0.53**	0.78**	-

**Note(s):** Variables 1–6 are between-level variables, and variables 7–12 are within-level variables. Correlations below the diagonal represent between-person correlations ( $n = 75$ ). Correlations above the diagonal represent within-person correlations ( $n = 750$ ). To calculate between-person correlations, we averaged the within-person scores across days. <sup>a</sup> Between-person. <sup>b</sup> Within-person. \*  $p < 0.05$ , \*\*  $p < 0.01$



Predictors	Mediation 1		Mediation 2		Moderated mediation	
	Model 1a Cognitive engagement	Model 1b Task performance	Model 2a Social support	Model 2b Task performance	Model 3a Cognitive engagement	Model 3b Task performance
Sex <sup>a</sup>	0.38**	-0.15	0.19	0.08	0.23*	-0.14
Age <sup>a</sup>	0.01	-0.01	-0.01	0.00	0.01	-0.01
Education <sup>a</sup>	0.02	-0.07	0.16	-0.14	-0.07	-0.07
Private company <sup>a</sup>	0.12	0.30	0.34	0.20	-0.21	0.29
Foreign company <sup>a</sup>	0.29	0.35	-0.50	0.32	-0.02	0.33
State-owned company <sup>a</sup>	0.17	0.24	0.34	0.18	-0.10	0.22
Workload <sup>a</sup>	0.21*	-0.13*	0.16	-0.03	0.13	-0.12*
Sleep quality <sup>b</sup>	0.07**	0.03	0.03	0.05*	0.07***	0.03
Non-work-related IM <sup>b</sup>	-0.11***	-0.01	0.05	-0.06*	-0.14***	-0.02
Social support <sup>b</sup>				0.14***	0.17***	0.10***
Cognitive engagement <sup>b</sup>		0.39***				0.35***
Non-work-related IM × Social support <sup>b</sup>					0.09***	0.05*

**Note(s):** <sup>a</sup>Between-person variables ( $n = 75$ ). <sup>b</sup>Within-person variables ( $n = 750$ ), \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 2.** Multilevel path analysis

which was statistically significant and positive ( $b = 0.14, t(64) = 4.90, p < 0.001$ ). However, the indirect effect of non-work-related IM on daily task performance through social support was not statistically significant ( $b = 0.01, t(64) = 1.65, 90\% \text{ CI} [0.00, 0.02]$ ). Therefore, the current analysis fails to provide support for [Hypotheses 3](#) and [4](#).

#### Moderating effect of social support

We tested the moderation effect of social support ([Hypothesis 5](#)) by including the interaction term between non-work-related IM and social support in our multilevel path analysis model. The structural model with all path coefficients, including the main, indirect and moderation effects (as depicted in [Figure 1](#)) exhibited good fit to the data:  $\chi^2(36, 75) = 402.29, p < 0.001$ , CFI = 0.91, SRMR (within) = 0.05, SRMR (between) = 0.03. As reported in Model 3a in [Table 2](#), social support significantly moderated the relationship between non-work-related IM and cognitive engagement ( $b = 0.09, t(63) = 4.24, p < 0.001$ ), thereby confirming the first-stage moderation. Furthermore, simple slope analysis demonstrated that the relationship between non-work-related IM and cognitive engagement was significantly negative when social support was low ( $-1 \text{ SD}$ ) but became insignificant when social support was high ( $+1 \text{ SD}$ ).

To check the significance of moderated mediation, we tested the conditional indirect effects using a bootstrapping procedure ([Preacher et al., 2010](#)). Specifically, we conducted simple slope tests in multilevel modeling to examine if the estimated indirect effects of non-work-related IM on task performance via cognitive engagement differ given low ( $-1 \text{ SD}$ ) and high ( $+1 \text{ SD}$ ) levels of social support. The negative day-level indirect effect of non-work-related IM on daily task performance was significant only for individuals who reported low social support in the same day ( $b = -0.08, t(63) = -5.52, p < 0.001$ ) but was not significant for

those who experienced high social support ( $b = -0.02, t(63) = -1.56, p = 0.12$ ). These indirect effects at the high versus low social support levels significantly differed from each other ( $b = 0.06, t(63) = 3.87, 95\% \text{ CI } [0.03, 0.09]$ ). That is, a one-unit (i.e. 1 SD) increase in social support is related to a 0.06 unit decrease in the negative indirect effect of non-work-related IM on cognitive engagement. Thus, the negative indirect effect became insignificant for individuals with high social support, which supports [Hypothesis 5](#).

## Discussion

This study utilizes the ESM to investigate the day-level processes through which non-work-related IM affects task performance of a given workday. We draw on the COR theory ([Hobfoll, 1989](#)) and positive spillover theory ([Edwards and Rothbard, 2000](#)) to propose and validate the potential resource loss and generation effects of non-work-related IM through cognitive and social resources. Our analysis reveals that non-work-related IM is negatively related to cognitive engagement but is not related to social support reported on the same day. Cognitive engagement and social support are positive predictors of daily task performance. Furthermore, social support moderates the indirect effect of non-work-related IM on daily task performance through cognitive engagement, and this indirect effect becomes insignificant when social support is high. Below, we discuss the implications of the current study and its limitations and the directions for further research.

### *Theoretical implications*

The current theoretical and empirical analysis offers new insights into the function of non-work-related IM in the workplace. First, this study complements the dominant perspective that highlights the dysfunctional consequences of smartphone use by investigating its positive potential. Research from the information technology literature has mostly focused on the dark side of non-work-related IM, which is regarded as a mere depletion of resources ([Andel et al., 2019](#)). This view is in line with the COR theory arguing that individuals have limited resources to satisfy various needs in life ([Hobfoll, 1989](#)). The present study confirms this prevailing belief by showing that non-work-related IM is negatively related to cognitive engagement and indirectly affects daily task performance. This detriment through cognitive resources represents the distracting, resource-depleting function of non-work-related IM.

Moreover, our analysis indicates the need for a balanced view that considers both the dark and bright sides of smartphone use in the workplace. We hypothesized that non-work-related IM promotes daily task performance by supplying social resources. However, non-work-related IM exhibited only a weak positive relationship with social support and a weak positive indirect effect on daily performance through social support, with both effects failing to achieve the conventional significance level of a  $p$  value below 0.05. These weak patterns may indicate the possibility that non-work-related IM is somewhat value-neutral and thus becomes a channel not only for exchanging positive messages but also for continuing struggling personal relationships during work hours (cf. negative spillover from family to work; [Cheng et al., 2019](#)). Various factors and not just talking with “whom” but also talking about “what”, “when” and “why” will contribute to the extent of social support that employees experience from IM chats ([Wang and Tchernev, 2012](#)). Unfortunately, we could not evaluate these possibilities according to the content, timing and reasons for non-work-related IM because the current measure investigated the frequency without specifying these additional properties. To clarify and further explore this speculation, an intriguing direction for future research involves evaluating the effects of these various properties of non-work-related IM toward social support and social undermining.

Second, the present analysis reveals the significance of considering various types of resources and their interaction to fully understand the role of non-work-related IM in the

workplace. Complementing the prevailing focus on cognitive processes, the current analysis demonstrates the significance of social resources. Social support on the basis of guidance, assistance and emotional closeness with others has a significant main effect on daily task performance (Booth-LeDoux *et al.*, 2020). Social support obtained from personal ties tends to spill over to the work domain (i.e. positive spillover effect; Edwards and Rothbard, 2000). For example, receiving appreciative comments and praises from friends or family members may reduce self-doubt regarding one's task capabilities, thereby maintaining the sense of self-efficacy even after stressful interactions or excruciating task events.

More importantly, social support moderates the effect of non-work-related IM on cognitive engagement and daily task performance. Social support from friends and relatives may provide emotional security and a positive mood that spill over to work morale (Edwards and Rothbard, 2000). Those positive affective experiences also promote cognitive operations and expand cognitive strategies, thereby counteracting the negative effect of non-work-related IM on cognitive engagement (Ed *et al.*, 2020). By contrast, deficient social support tends to elicit a negative mood which, in turn, constrains cognitive processes and impairs task-related problem solving (Ed *et al.*, 2020). Employees experience greater depletion of cognitive resources from non-work-related IM when they lack social support. This consideration of a combinatory and resulting complementary effect may offer distinct insights beyond the separate main effects of the two resource types (Hobfoll, 1989).

Third, the current analysis highlights the importance of evaluating the intermediate processes that lead to the ultimate outcomes rather than concentrating on the direct effect of non-work-related IM. Previous studies reporting mixed or insignificant effects of cyberloafing or smartphone use in the workplace have failed to offer an adequate understanding of the given phenomenon, perhaps because they have neglected the intervening mechanisms (e.g. Andel *et al.*, 2019). By considering various intervening mechanisms, we reveal that the relationship between non-work-related IM and daily task performance can be explained by different resources and their interactions. Further research can be directed to additional resources, such as motivational or informational resources, that may be activated by non-work-related IM to affect various individual outcomes.

### *Practical implications*

The present findings have practical implications for managers and organizations. A critical lesson is that non-work-related IM in the workplace can be a double-edged sword with potential benefits and shortcomings. Our analysis shows that non-work-related IM impairs daily task performance by diminishing cognitive engagement. Thus, managers should be aware of this dysfunctional effect of non-work-related IM, particularly for cognitively demanding tasks that require full attention and absorption of employees.

The current findings offer a potential strategy to protect employees from the harm of non-work-related IM, the one that recognizes that the negative effect of non-work-related IM disappears when employees perceive social support from friends and family members. Thus, promoting social support as perceived by employees is a promising direction in accommodating non-work-related IM while avoiding its detriment in the workplace. As social support from non-work-related relationships spills over to the work domain, organizations have implemented various family-friendly practices and allowed employees to keep links with non-work ties during work hours (Elhai *et al.*, 2016). Consequently, managers should be aware that simply cutting employee connections with personal ties may neither be realistic nor optimal for organizational performance.

From the perspective of employees, the current findings offer valuable insights regarding effective strategies to handle their smartphone uses for personal purposes. Employees should be aware of the pros and cons of non-work-related IM and associated psychological mechanisms so as to initiate an adequate self-monitoring of their use of IM apps at work. The

current analysis indicates that employees can offset the depletion of cognitive resources and distraction from non-work-related IM by securing sufficient social support from interacting with friends and family members (Elhai *et al.*, 2016). In line with the micro break research (Kim *et al.*, 2018), non-work-related IM can generate room for breathing and releasing psychological tension among employees. The motivational benefits of micro breaks and non-work-related IM can be particularly important for employees with pressing task demands. The challenge lies in achieving psychological wellbeing and work–life balance without compromising the task performance of employees.

#### *Limitations and future research directions*

The current findings should be interpreted with caution by considering the following limitations that should be addressed in future research. First, all study variables were based on self-report measures. This concern is somewhat alleviated by the fact that the current data were generated from a general survey and the repeated measures of three assessments daily over a 10-day period, an approach which is effective for minimizing common method variance (Johnson *et al.*, 2011). In addition, the temporal separation of the control, independent and mediating variables and the dependent variable divided into the morning, afternoon and evening surveys reduces the possibility of reverse causality. Nonetheless, future research may replicate the current findings using data from different sources, such as objective performance measures, observations or third-party ratings.

Second, the current measure of non-work-related IM is limited because it assesses only the frequency. In addition to frequency, the time, duration or interval of non-work-related IM should likewise be examined. To complement the often-used retrospective or generalized responses obtained with interviews or questionnaires, smartphone IM app records of the actual total time duration, frequencies, interval and average of each incident can be used to obtain precise and objective information of the IM usage patterns. Thus, future research should explore how such IM usage patterns affect employee morale and performance.

Third, the current analysis focuses on the consequences of non-work-related IM. To develop a comprehensive understanding and nomological network, further research may explore the antecedents of non-work-related IM and potential boundary conditions. For example, researchers have investigated various antecedents of the personal use of the internet during work hours, including attitudes, emotional factors, habits and different sources of social influence (Moody and Siponen, 2013). Future research should also identify situational or contextual factors that may moderate the emergence of non-work-related IM and its effect on performance outcomes, an approach which may offer critical managerial implications.

Despite the aforementioned limitations, the present analysis develops and validates a balanced perspective on the function of non-work-related IM by considering the social and cognitive ramifications for employees and their task performances. An intriguing aspect to consider in extending the current study involves how the process and performance implications of non-work-related IM can vary depending on the content and emotional tone of those social interactions. These parameters that define the nature, valence and content of a given non-work-related IM can shift personal and organizational outcomes. Future research should explore the effects of different communication contents, particularly when IM aims to share positive or negative events in the work or personal domains.

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