Am I “Pushed” to Loaf at Work? A Study of Push Notification Triggered Mobile-loaﬁng

Research-in-Progress

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Abstract

With the prevalent use of smartphones and the emergence of the fourth generation of mobile telecommunications technology (4G), an increasing number of employees use their smartphones with cellular data for non-work related purposes during working hours. Compared to traditional cyberloafing, smartphone with cellular data provides a more convenient and private access to the Internet without any restriction of the company network. In this study, we introduce a new construct called mobile-loaﬁng to describe this phenomenon. To understand the antecedents and consequences of mobile-loaﬁng, we build a new research model of push notification triggered mobile-loaﬁng. We argue that push notification is positively related to mobile-loaﬁng, while notification timing and notification source type moderate this relationship. In addition, the relationship between mobile-loaﬁng and productivity has an inverted U-shape. To empirically test the model, a lab experiment with a 2×2×2 design will be conducted.

Keywords: Mobile-loaﬁng, push notification, timing, social network, productivity
Introduction

With the ubiquity of Internet use in companies, most employees have experiences of browsing non-work related websites, sending personal e-mails and updating social network homepages during working hours. A survey conducted by WebSense.com\(^1\) in 2005 indicated that about 61% of American employees admitted using companies' Internet access for personal purposes during working hours. Another survey conducted by the same company in 2006 found that the average American employee spent about 24% of his/her working hours on these non-work related activities. To describe this phenomenon, previous literature developed a concept called cyberloafing, which is defined as voluntary acts of employees using their companies' Internet access for non-work related purposes during working hours (Lim 2002). Since a company with 1000 Internet users may lose up to US$ 35 million every year due to non-work related Internet using (Solutions 2014), most companies have taken measures to prevent cyberloafing, such as monitoring employees’ e-mails, tracking their movements in cyberspace, or blocking some external websites (Siau et al. 2002). However, most of these measures lost efficacy with the development of latest mobile and communication technologies, especially with the prevalent use of smartphones and the emergence of the fourth generation of mobile telecommunications technology (4G).

Smartphone refers to “a mobile phone that is able to perform many of the functions of a computer” (Dictionary 2014), while 4G telecommunication networks provide a much higher information transfer rate compared to prior mobile telecommunication technologies. In the workplace, a smartphone with 4G services offers employees a more convenient and private access to the Internet without any restriction of the company network. Therefore, an increasing number of employees tend to use their own smartphones with cellular networks, instead of company computer and network, to loaf at work. In order to better describe this new phenomenon, we introduce a new construct called mobile-loafing, which is defined as voluntary acts of employees using smartphones for non-work related purposes during working hours.

Generally, before employees begin to loaf at work, they usually need to first switch from work related tasks to non-work related tasks. Previous literature has indicated that external interruption is a main reason for a significant portion of task switching (Czerwinski et al. 2004). That is, if employees are interrupted by some external stimuli during working, they are more likely to switch to non-work related activities. Nevertheless, with the prevalence of smartphones and social network apps, people are interrupted by various mobile push notifications from time to time at work. Therefore, we wonder whether interruptions caused by mobile push notifications have an influence on the following mobile-loafing behaviors. Moreover, as indicated in previous literature, features of interruptions can make them more or less disruptive to an ongoing task (Gillie and Broadbent 1989; Speier et al. 1999; Speier et al. 2003). Hence, different kinds of notifications received under different circumstances may also have different influence on mobile-loafing behaviors. Thus, our first research question is: how does push mobile notification influence employees’ mobile-loafing behaviors?

In addition, although most previous literature indicated that cyberloafing leads to productivity loss and is harmful to organizations (Lim 2002; Lim and Teo 2005; Maestrangelo et al. 2006), some researchers argued that cyberloafing sometimes serves as a palliative coping strategy against stress or fatigue at workplace, so that it can also have a positive effect on the work productivity (Anandarajan and Simmers 2005; Oravec 2002; Stanton 2002). To explain these conflicting findings, Lim and Chen (2012) proposed that we should differentiate different forms of cyberloafing and their impact on work productivity. As a new but prevalent form of loafing, mobile-loafing has some unique characteristics which are different from other forms of loafing behaviors. Since research on the relationship between mobile-loafing and work productivity is still lacking, our second research question is: what is the relationship between mobile-loafing and productivity?

To answer our research questions, a lab experiment with a 2×2×2 design (i.e., 2 types of notification modes × 2 types of notification timing × 2 types of notification source types) will be conducted. Two types of notification modes are (1) push notification and (2) non-push notification. Two types of notification timing include: (1) when employee’s self-regulatory sources are low; (2) when employee’s self-regulatory sources are high. Two types of notification sources are: (1) social network related notification and (2) non-

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\(^1\) WebSense.com (www.websense.com) is an Internet monitoring company specializing in computer security software.
social network related notification. The rest of the paper will be organized as following. In section 2, we give a literature review about antecedents and consequences of cyberloafing and mobile-loafing. In section 3, we develop our research model and justify the research hypotheses. In section 4, we introduce the lab experiment which will be conducted to examine the proposed model. Finally, we discuss the potential theoretical and practical implications in the last section.

**Literature Review**

**Mobile-loafing and Cyberloafing**

As one of the most important inventions in the last decade, smartphone has been widely used in the world. According to a recent statistic, the number of smartphone users has researched 1.75 billion in 2014 (eMarketer 2014). One of the features that differentiate smartphone and normal mobile phone is that users can install a variety of apps on the smartphone. Nevertheless, because of the rapid development of mobile apps, more and more employees tend to use their smartphones for personal recreation or social network purpose during working hours. In this study, we define this kind of non-work related usage of smartphone during working hours as mobile-loafing.

Compared to traditional cyberloafing, mobile-loafing does not need to rely on the company computer and network. Hence, it is not restricted by organization’s monitoring of Internet activities and hard to be prohibited completely. Moreover, the mobility and portability of mobile devices make mobile-loafing not easy to be observed by supervisors, so that employees are able to maintain the guise of working hard while playing on their smartphones inconspicuously. In addition, since most apps have push notification functions, it is highly likely that employees are interrupted by these notifications while working, and continue to check some other apps on the smartphone after the interruption. Based on all these points discussed above, we argue that mobile-loafing is more likely to occur than traditional cyberloafing. Fortunately, employers do not need to worry about the legal liabilities or computer viruses caused by mobile-loafing using 4G services, because company network is not even used in this process. Table 1 summarizes the comparison between cyberloafing and mobile-loafing.

| Table 1. Summary of Comparison between Mobile-loafing and Cyberloafing |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | Mobile-loafing  | Cyberloafing    |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Device          | Smartphone      | Computer        |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Network Provider| 4G telecommunication networks | Company        |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Prohibition Difficulty | High       | Medium          |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Guise Difficulty | Low             | Medium          |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Triggered by Interruption | Often  | Sometimes       |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Occurrence Frequency | High     | Medium          |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Harmfulness     | Low             | High            |                 |                 |                 |                 |                 |                 |                 |                 |                 |

**Antecedent: Push Notification**

A lot of prior studies have investigated the antecedents to cyberloafing. For example, Lim (2002) rationalized cyberloafing as a means of reinstating justice in the unfair social exchange relationship. Wagner et al. (2012) tested how time spent in sleeping and the quality of sleeping influence employee’s cyberloafing behavior. Jia et al. (2013) examined the impact of employee’s Big Five personality traits and workplace situational factors on cyberloafing. Some researchers suggested pleasure seeking, boredom and avoidance of less rewarding tasks as potential situational factors influencing cyberloafing (Hills and Argyle 2003; Jia et al. 2013; Lavoie and Pychyl 2001; Stratton 2010), while others focused on the effect of technology characteristics (e.g., perceived usefulness of the Internet) on the amount of cyberloafing (Garrett and Danziger 2008; Vitak et al. 2011). In addition, Blanchard and Henle (2008) divided cyberloafing behaviors into two primary forms: minor cyberloafing (e.g., sending and receiving personal email at work) and serious cyberloafing (e.g., online gambling, surfing adult oriented web sites). They
argued that external locus of control is related to both minor and serious cyberloafing, whereas coworker and supervisor norms of cyberloafing are only related to minor cyberloafing but not the serious one.

However, despite these existing findings regarding cyberloafing, it is still necessary to conduct a study of notification triggered mobile-loafing for the following two reasons. First, as discussed above, mobile-loafing is a new form of loafing which tends to occur more frequently than traditional cyberloafing. Since different forms of loafing behaviors are usually influenced by different factors due to their unique characteristics, like the example of minor cyberloafing and serious cyberloafing, it would be interesting to explore the factors which make mobile-loafing more prevalent. Second, previous literature indicated that task switching can be either driven by the employee’s own need to terminate the ongoing task or the alert about arrival of new information (Iqbal and Horvitz 2010). That is, besides the antecedents studied in the prior literature, the switching from work to non-work related tasks can also be triggered by external stimuli at workplace. However, to the best of our knowledge, all of the previous studies focused on the occurrence of cyberloafing under no external stimuli circumstances. Thus, it is necessary to conduct a study to investigate mobile-loafing behaviors triggered by external stimuli.

Generally, the beginning of mobile-loafing involves a process of switching from work related task to non-work related task. Since external interruption accounts for a large portion of task switching (Czerwinski et al. 2004), a lot of employees are interrupted by various mobile push notifications at workplace and then switch their tasks. More importantly, after employees deal with these notifications on the mobile phone, it is highly likely that they will not switch back to work instantly, but continue using their mobile phone to conduct other non-work related activities, because their memory of the primary task has been interrupted (Edwards and Gronlund 1998). Therefore, it is reasonable to argue that frequent interruptions of push notifications from smartphones serve as an important trigger of mobile-loafing behaviors.

**Consequence: Productivity**

Compared to the behaviors of cyberloafing or mobile-loafing, the construct that companies are more concerned with is employee’s productivity (Henle and Blanchard 2008; Lim and Chen 2012). A lot of statistics have shown that employees’ misuse of the Internet may greatly reduce their work productivity. For example, Conlin (2000) indicated that cyberloafing may result in 30 to 40 percent of productivity losses and cost organizations $54 billion annually. Similarly, Verton (2000) also emphasized that up to 40 percent of employee productivity can be lost due to surfing the Internet for non-work related purposes. Even worse, some researchers indicated that cyberloafing can expose organizations to legal liabilities in the form of copyright infringement (e.g., illegal music downloading), defamation (e.g., posting lies about a manager on the Internet) and harassment (e.g., using company network to email sexist or racist jokes) (Henle and Blanchard 2008; Lim 2002). Moreover, employees’ misuse of the Internet for personal purposes increases the possibility that computer viruses enter the company network (Lim 2002). In sum, all these factors together suggest that cyberloafing may pose a great “threat” to companies in terms of productivity and other intangible cost incurred (Lim 2002).

Fortunately, the issue becomes less complicated when we consider the negative consequences of mobile-loafing. Since employees do not rely on the company network to access the Internet, problems such as legal liabilities or computer viruses entering company network will not be induced by mobile-loafing using cellular data. Therefore, we only consider the productivity change caused by mobile-loafing behaviors in this study. However, there are still some conflicting views about this relationship. Most researchers believe that non-work related activities during working hours severely impair employee’s work productivity (e.g., Block 2001; Lim 2002; Lim and Teo 2005; Mastrangelo et al. 2006), while others argued that appropriate relaxing from work has a positive effect on the productivity (Anandarajan and Simmers 2005; Oravec 2002; Stanton 2002). To further explain this relationship, Blanchard and Henle (2008) divided cyberloafing into two categories: perceived serious cyberloafing (e.g. online gambling, surfing adult-oriented websites) and minor cyberloafing (e.g. sending and receiving personal emails). They argued that minor cyberloafing is innocuous, whereas serious cyberloafing tends to decrease the productivity. Since most mobile-loafing behaviors (e.g., reading news, checking social network sites) can be classified as minor loafing behaviors, appropriate mobile-loafing may serve as a palliative coping strategy to help employees relax from their intense work.
Mode Development and Research Hypotheses

Triggers of Mobile-loafing

In most smartphones, users are allowed to set their notification mode as either push mode or non-push mode. Under the mode of push notification, smartphone owners will receive an alert when there is any message, content update or other event within their apps. Such alert can be regarded as an interruption to cause one to stop a scheduled task and respond to the stimulus (Jackson et al. 2002). On the contrary, under the mode of non-push notification, no alert will be sent to users when there are new notifications. In this case, users will not be able to notice the latest messages, content updates or other events until they check their mobile phones. Hence, employees are more likely to be interrupted by mobile notifications if they set the notification as push mode than if they set it as non-push mode.

Previous literature has showed that people's memory for the primary task can be impaired by interruptions (Czerwinski et al. 2004; Edwards and Gronlund 1998). Hence, they will have difficulties returning back to the disrupted task following an interruption, such as an instant message, a phone call or a push notification from social network apps (McFarlane and Latorella 2002). Consequently, they may choose to switch to other tasks after the interruption. In our study, since push notification distracts employees' attention from work to smartphones, they may continue to use their smartphone for other purposes, such as checking social network sites or playing mobile app games, after the interruption, but not return back to work immediately. Therefore, interruptions by mobile push notifications increase the possibility that employees engage in non-work related activities on smartphone. Thus, we have:

H1: Push notification is positively related to mobile-loafing.

Notification Characteristics

In a recent study, Wagner et al. (2012) posited that cyberloafing can be regarded as a workplace temptation which requires employees to exercise their self-regulation to stay on the task. However, the ego depletion model of self-regulation indicated that each person has a limited quantity of resources available for self-regulation (Muraven and Baumeister 2000). All of the acts which require self-regulation may consume self-regulatory resources in a common pool until all the resources are drained (Muraven and Baumeister 2000). Therefore, the availability of self-regulatory sources is not a constant variable. It is decreasing with the consumption of self-control to avoid impulsive or counterproductive behaviors (Hagger et al. 2010; Marcus and Schuler 2004). Under the circumstance without any external stimuli, employees may start cyberloafing when their self-regulatory resources are exhausted (Wagner et al. 2012).

Similarly, the ego depletion model of self-regulation can also be applied to explain the push notification triggered mobile-loafing. The only difference between the situation with and without external stimuli is that the threshold of required self-regulatory resources to resist mobile-loafing is different. Generally, employees need more self-regulatory resources to avoid push notification triggered mobile-loafing, because the interruption of push notification increases the difficulty for employees to return to work (McFarlane and Latorella 2002).

If a notification is sent when employee’s self-regulatory sources are high, after dealing with the notification, the employee is more likely to have enough self-regulatory resources to resist the temptation and return to work. On the contrary, if a notification is sent when employees’ self-regulatory sources are low, after dealing with the notification, the employee is more likely to use the smartphone to conduct non-work related activities. Therefore, the timing of sending a notification determines the possibility of whether push notification can incur subsequent mobile-loafing behaviors. Thus, we have:

H2a: Notification timing moderates the relationship between push notification and mobile-loafing, such that the impact is stronger if notification is sent when employees’ self-regulatory sources are low than if notification is sent when employees’ self-regulatory sources are high.

In addition to notification timing, different source types of notifications may also influence the relationship between push notification and mobile-loafing. On smartphones, there are many different types of functions and apps, such as phone calls, short messages, e-mails, game apps and social network apps. With the prevalent use of social network sites, a large number of people spend a huge amount of
time on social network sites (e.g., Facebook, Twitter and Instagram) everyday (Xu and Tan 2012). According to a recent study, the use of social network apps accounts for a large proportion of the total smartphone usage (Böhmer et al. 2011). In order not to miss friends’ latest updates and comments, a lot of people check social network sites on their smartphones from time to time.

Therefore, in this study, we categorize different mobile notifications as social network related notifications and non-social network related notifications. If a notification is from a social network site (e.g., friend invitation or tagging notification), after dealing with the notification, it is convenient for the employee to check his/her friends’ latest updates or comments because he/she has already opened the app. Moreover, this kind of notification may also remind the employee of the updates on social network sites, which induces him/her to further check other related social network apps and interact with his/her friends on the smartphone. On the contrary, if a notification is not from a social network related app (e.g., short message or e-mail), after dealing with the notification, the employee will not be reminded of the updates on social networks sites and thus is less likely to open other apps. Hence, whether the notification is related to social network also influences the possibility that push notification can trigger the subsequent mobile-loaing behaviors. Thus, we have:

**H2b:** Notification source type moderates the relationship between push notification and mobile-loaing, such that the impact is stronger if the notification is from a social network related app than if the notification is from a non-social network related app.

**Productivity**

Due to the increasing work intensity and pressure in the modern society, a lot of studies have emphasized the importance of break time at workplace (Korpela 1992; Oravec 2002; Roy 2003). They argued that participating in off-task activities may help employees gain fresh perspectives, which in turn increases their creativity and flexibility of mind. With the prevalent use of Internet at workplace, Oravec (2002) posited that constructive use of online recreation and play may make employees feel more relaxed and ultimately become more productive. Moreover, other researchers also indicated that cyberloafing sometimes serves as a palliative coping strategy against negative experiences at workplace, so that it has a positive effect on the work productivity (Anandarajan and Simmers 2005; Oravec 2002; Stanton 2002).

In our study, as discussed in the previous sections, most mobile-loaing behaviors (e.g., reading news, checking social network sites) can be categorized as minor loaing behaviors. Therefore, a relative short time of mobile-loaing tends to relax employees from intense work, and thus improves their productivity. On the contrary, excessive mobile-loaing will impair work productivity due to the large amount of misused working hours. Thus, we have:

**H3:** The relationship between mobile-loaing and productivity has an inverted U-shape.

Figure 1 shows the research model of push notification triggered mobile-loaing. Push notification is positively related to mobile-loaing behaviors. This relationship is moderated by two notification characteristics: notification push timing and notification source type. Moreover, appropriate mobile-loaing may increase employees’ productivity, while excessive such behaviors will have a negative impact on the productivity.
Methodology

The hypotheses proposed in the present study will be tested through a lab experiment with a $2 \times 2 \times 2$ design (i.e., 2 types of notification modes × 2 types of notification timing × 2 types of notification source types). Notification mode can either be push or non-push. Two types of notification timing include: (1) when employee's self-regulatory sources are low; (2) when employee's self-regulatory sources are high. Two types of notification sources are: (1) social network related notification and (2) non-social network related notification.

Experimental Design

We will recruit 400 undergraduate students from the same class (i.e. same grade and same department) in a major public university. Selecting subjects from the same class serves two benefits. First, similar background helps eliminate potential heteroskedasticity across individuals in work productivity. Second, subjects from one class are more likely to know each other, which provides convenience for us to choose a person who will send social network related notifications to the others in the experiment.

All participants will be randomly assigned to 8 groups to conduct a human coding task within fixed time. Each time, five participants will attend the experiment together. Meanwhile, a student will be hired to pretend to be a participant sitting beside them. However, the student's real task is to observe other subjects’ mobile-loafing behaviors during the experiment and record their loafing time. At the beginning of the experiment, each participant will receive a data set of 10,000 hotel reviews and be required to tag these reviews as either positive or negative. They will be asked to code as many reviews as possible. We will also install a camera behind the participants to record their mobile-loafing behaviors for data triangulation.

To manipulate notification mode, subjects will be required to set their notification mode as non-push or push at the beginning of the experiment. In the non-push group, a research will ask all the subjects to set their notification mode as non-push in order not to influence the other subjects. In the push group, a research will give the same instruction, but let them set the notification of a certain app (whether social network related or non-social network related depending on the manipulation of notification source type) as push. The researcher will tell them that the reason to set only one notification as push is because they will receive different passwords for their own task through that app.

To manipulate notification source type (i.e., social network related notification vs. non-social network related notification), subjects in the non-social related group will receive text messages from their classmate, while those in the social related group will receive Facebook messages from the same person. Participants who have finished the experiments will be asked to invite his/her classmates to attend the next experiment, and send messages to them in the next experiment. To manipulate notification timing, participants assigned in the high self-regulation group (i.e. early period of the experiment) will receive messages in the first two hours, with a frequency of every 15 minutes. In contrast, those falling in the low
self-regulation group (i.e. late period of the experiment) will receive messages in the last two hours with the same frequency. Therefore, each participant will receive eight messages in total. At the end of the experiment, a questionnaire will be distributed to each participant to ask their perceived level of self-regulation when they receive the notifications during the experiment. This will be conducted for manipulation check of notification push timing.

**Measurement**

The measurements for mobile-loafing comprise mobile-loafing duration and frequency. Mobile-loafing duration refers to time spent in the non-work related mobile use. Mobile-loafing frequency is measured as the number of times that a participant use mobile to conduct non-work related activities during the experiment. Both measurements will be recorded by the student besides the participants. In addition, cyberloafing duration and frequency will also be recorded in the experiment. Productivity is measured as the quantity of coded reviews and the accuracy of the coding, which is obtained through the comparison between their results and the standard answer.

**Conclusion**

In this study, we build a new model to explain the phenomenon of push notification triggered mobile-loafing. Based on the previous literature on cyberloafing and interruption, this study has the potential to make both theoretical and practical contributions. First, we introduce and define a new phenomenon of mobile-loafing. Through the comparison between mobile-loafing and traditional cyberloafing, we show the unique characteristics of mobile-loafing, and explain why it is more likely to occur at workplace. Second, after a thorough literature review about the antecedents to cyberloafing, we find that studies investigating external stimuli triggered task switching (i.e., from work related task to non-work related task) are lacking. Thus, we propose a theoretical model to explain push notification triggered mobile-loafing. Third, we further investigate under what circumstances push notification triggered mobile-loafing is more likely to occur. Two moderators: notification timing and notification source type are discussed in the paper. Forth, to address the conflicting views about the relationship between loafing behaviors and productivity, we propose that moderate mobile-loafing has a positive effect on work productivity, while excessive mobile-loafing impairs productivity. Fifth, we propose a lab experiment to empirically test the model by simulating the real workplace. Finally, based on the future results of the study, we can find some approaches to control the amount of mobile-loafing within a reasonable range. By using these approaches, we are able to not only increase work productivity but also enhance employees’ satisfaction at workplace.
References


