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# Who Matters: A Closer Look at Interpersonal Relationship in Mobile Interruptibility

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UbiComp/ISWC'17 Adjunct, September 11–15, 2017, Maui, HI, USA  
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ACM ISBN 978-1-4503-5190-4/17/09.  
<https://doi.org/10.1145/3123024.3124569>.

**Abstract**

Interruptibility research is growing in computer-mediated communication (CMC). While much CMC research concerns “interpersonal” communication, we have not seen a close examination of the impact of *who* in mobile interruptibility research. In this paper, we propose a study more closely investigating the interplay between interpersonal relationship characteristics with contextual factors and their impact on users’ receptivity to communication.

**Author Keywords**

Interruptibility; Context-Aware Computing; Ubiquitous Computing; Social Roles.

**ACM Classification Keywords**

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous; H.1.2 [Models and Principles]: User/Machine Systems

**Introduction**

Computer-mediated communication (CMC) is one of the important fields in human computer interaction that concerns interpersonal communication via technology. As much of communication nowadays goes to online and is via mobile messaging, there is a noticeable shift of interruptibility research from workspace to mobile phones. Mobile interruptibility research, roughly

speaking, primarily concern how interruptible/receptive mobile users are for attending and responding to a task on mobile phones, such as attending to a notification [7,9,23] looking at a message [20], answering a questionnaire [22] [21], and even perform a crowdsourcing task [6,13]. This trend shows an extension of research from interpersonal communication for social purposes to researcher-, institution-, or system-end-user interaction, largely because of the growing interest in leveraging users' opportune moments for performing interventions, sending crowdsourcing tasks, and so on.

On the other hand, there is interruptibility research concerning interpersonal relationship that includes sender-recipient relationship as a factor for predicting interruptibility for attending to communication-related notifications (E.g.[2,4,12,17,18,19,25]). For example, early works show that users are more receptive to notifications from relatives and close friends [9,25]. It is noteworthy that this line of research mostly operationalizes contact by classifying it into several discrete relationship types, such as Friend, Co-worker, Family, Other[12,17,19]. In other works, categories are further divided into sub-categories such as Co-worker into Superior and Subordinate Co-worker[2,18] Family into Immediate and Extended[18]. In addition, other categories include: People you work with; People you do hobbies/activities with; Strangers, etc [25].

We argue that, however, this categorization assumes that interpersonal relationship can be mapped to a limited number of discrete categories. But it simplifies the social dynamics between people in interpersonal communication. For example, for some people, family members are not necessarily considered closer than

their particular roommates, colleagues, or classmates. Within a category, such as family members or colleagues, closeness can vary significantly (close colleague vs non-close colleague). Moreover, people may feel obligated to respond to messages from certain people than from others even if they are not close (e.g. supervisors vs. friends). People may also attend or respond to a person's messages more quickly if they recently have had communication with them. To gain a better understanding of how sender-recipient relationship characteristics impact mobile receptivity, we need a closer look at interpersonal relationship.

We propose using ESM to study users' receptivity to mobile notifications with a primary focus on the impact of *who*. We propose to operationalize sender-recipient relationship characteristics using two types of measures: 1) **Questionnaires** from psychology and communication fields that measure the user's closeness, (over)dependence, obligation to answer, and answer expectation with each sender, respectively; 2) **Interaction Logs** that measure the user's communication intensity and frequency with each sender.

We expect this study will contribute to better understanding of the impact of sender-recipient relationship characteristics on mobile receptivity.

## Measuring Interpersonal Relationship for Mobile Communication

### *Interaction Logs*

Research has shown that interaction characteristics such as intensity and frequency are correlated with people's closeness. For example, Wiese et al. [24]

suggests that people are more willing to share their information with whom they are closer to, and the frequency of messaging is related to the closeness between two people. Avrahami et al. [3] suggests that overall length of sessions and the message exchange rate on instant messaging services are strong indicators for relationship type. Therefore, we decide to log users' communication history on their phone to measure their interaction intensity and frequency with each sender captured during the ESM study.

#### *Questionnaires and Scales*

We conducted a literature review on interpersonal relationship in psychology and communication to find scales measuring interpersonal relationship and measures that might play a role in mobile communication. The Relationship Closeness Inventory (RCI) developed by Berscheid et al. in 1989 [5] was the most well known and widely used scale for measuring interpersonal relationships. However, considering that the scale is too long for a user to answer for a number of senders in our study. We aim to find alternative scales that are more lightweight and have been examined its validity and reliability. Based on these criteria, we decide to use a scale called Inclusion of Other in the Self Scale (IOS) [1] because it is well known for its simple-to-use advantage. A recent study also found IOS highly positively correlated with six scales designed to measure relationship closeness [10]. We will also use a scale aimed to represent an improvement over both RCI and IOS, called Unidimensional Relationship Closeness Scale (URCS) [8]. URCS is significantly more lightweight than RCI and has been tested its validity and reliability, and correlation with IOS [8]. Finally, as Wiese [24], we will also include a simple measure, asking "How close do

you feel to this person?" on a 1-5 Likert scale to compare with the results of URCS and IOS.

We also surveyed other factors that may impact users' mobile receptivity to particular senders, which thus we think worthwhile to include. For example, [11] found a high correlation between dependence and mobile maintenance expectation. Following that research, we will measure users' dependence and mobile communication maintenance with their contacts as [11] did to examine their correlation with mobile receptivity, respectively. Another two relevant measures to include are obligation to answer and answering expectation [16], which we think may be(in) directly influential on attentiveness to incoming messages.

Participants will fill all these scales with each selected (instead of all) senders captured in the interaction logs. The measures then will be compared and correlated with interaction intensity as well as ESM responses. The number of senders is to be determined in a pilot study.

Finally, [16] indicates that personality traits of Fear of Ostracism (FOST) and Need to Belong (NTB) are positively related to perceived obligations to answer and answer expectations toward chat partners. These two are measured by the scale in [14] and [15]. We are considering measuring these two traits but meanwhile are worried about the burden on the participants. We will evaluate the burden during a pilot test.

#### **User Study**

Similar to prior research studies in mobile interruptibility, we propose a two-week long Experience Sampling Method (ESM) study to examine the impact of interpersonal relationships on mobile receptivity. We

will also perform phone logging as well as a post-study interview to obtain a variety of data to get more insights. We give more details in the following sections.

#### *The ESM Study*

We will use ESM to collect study participants' responses regarding their receptivity to sampled notifications. The ESM questionnaire will be delivered when the participants have started using their phone. A minimum duration of one hour is posed between any two questionnaires to obtain responses in more diverse contexts. The questionnaire is delivered between 8 a.m. and 12 a.m., and expires after 15 minutes. In each questionnaire, we display three sampled notifications received within 30 minutes and for each ask a set of questions regarding the participant's receptivity to them. Notifications from the same contact will only be included in one questionnaire. Questions in the questionnaire will include message categories, activity and engagement, current social and emotional context, and awareness of and actions on the notification (e.g. Did you notice the alert for this notification when it first arrived? How did you handle the notification when you first saw it?) [18]. These information has been found to have impacts on mobile receptivity in prior research.

#### *Phone Logging*

We collect contextual data on participant's phone to examine how interpersonal relationship characteristics interplay with contextual information to affect mobile receptivity. The collected data include location, mode of transportation, sensors, phone connectivity, ringer mode, battery life and so on. To avoid using the participant's mobile data usage, the logging application will only upload data when the phone is connected to a WiFi network.

#### *Post Study Data Collection*

After the ESM data collection, we will ask participants to label logged senders they have been interacted with during the study and send the labeled contact to us. As a return, we offer infographics of the participant's interaction with the senders based on the communication log. Meanwhile, we will ask them to fill the aforementioned interpersonal relationship related scales. Finally, we will invite them to a semi-structured interview to ask them more details about how they coordinate their communication with the senders.

#### *Recruitment Plan*

Our target participants are Android users at least 20 years old who are active on mobile messaging. We define a participant is "active" if he or she: 1) uses Facebook or Line messenger (the two most popular messaging service in Taiwan) every day, and 2) receives at least ten messages per day except a group chat. The participants' mobile phones are expected to stay connected in order to receive notification and ESM from our system. We will balance and maximize the diversity in participants' background (e.g. gender, occupation, social status) as well as in mobile messaging behaviors (e.g. overall frequency, and communication intensity with different contacts such as colleagues, family members and friends).

### **Summary**

We propose to measure interpersonal relationship characteristics using more formal scales to find how it impacts mobile receptivity. We believe the findings will be informative to mobile interruptibility research. Meanwhile, we are able to examine whether previous results still hold true in this research, and additionally, correlate the results from the scales to communication intensity as well as to mobile receptivity to messages.

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