

The Phone Rings But the User Doesn't Answer: Unavailability in Mobile Communication

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ABSTRACT

We know that phone calls and mobile text messages are not always promptly answered and responded to, yet we know little about the reasons for unavailability, its effects on a user's image, the ways in which users explain the reasons for it, and actions when users cannot reach someone. Usage logs (2,983 phone use events), Web-based diaries, and interviews ($N = 20$) were used to investigate occasional unavailability in a mobile communication context. We identified four categories of unavailability and found that 31.1% of the phone calls consisted of unsuccessful communication attempts and reciprocal calls back from people who were unavailable earlier. Interestingly, while participants paid attention to the need to give reasons for unavailability, they did not require the explanations to be truthful. These findings have implications for design of systems that better support the needs to manage and explain unavailability and manage pending communication requests.

Author Keywords

Unavailability, availability, communication, plausible deniability.

ACM Classification Keywords

H4.3. Information Systems Applications: Communications Applications.

General Terms

Design, Human Factors.

INTRODUCTION

The information and communication technology (ICT) of today – particularly the mobile phone – has made us continuously available for other people's communication attempts. This 'caller hegemony' [7] has led us not only to search for tactics to avoid communication in some situations but also to feel guilt and a need to apologise for unavailability, even though we cannot always avoid it.

There are many reasons phone calls and text messages are not always answered. But how many of these attempts are

deliberately turned down, or how unavailability is managed in everyday communication practice? It transpires that questions such as these have received surprisingly little attention in the literature. Knowing in what situations, how often, and for what reasons individuals decide *not* to answer their mobile phones, choosing to be unavailable for communication, would inform the design of more satisfying communication technologies.

The aim of this paper is to investigate *occasional unavailability* in computer-mediated communication (CMC) by adopting mobile phones as an entry point to this phenomenon. By 'occasional' we refer to situation-specific and temporally limited periods of unavailability. The paper is, therefore, not a mobile-phone-oriented study of 'non-use', which denotes wholesale avoidance or impossibility of using a certain technology because of resistance; irrelevance [22]; or insufficient infrastructural resources, wealth, or skills [21], for example (for typologies of forms of non-use and non-users, see [15,16,17]). On the contrary, the users addressed in this paper are adopters of mobile phones who are not always available for mobile communication. Most people living in the modern information society belong to this category of users.

The following research questions were considered:

- What is the frequency of unsuccessful communication attempts?
- What are the categories of unavailability (e.g., how often unavailability is an unavoidable consequence of the situation as opposed to purposely achieved by the user)?
- How do users manage their availability in order to decrease others' negative impressions and increase their positive impressions?
- How do users react when they cannot reach another person?

RELATED RESEARCH

Users employ various methods to control and communicate their availability. These often reflect the norms of acceptable social behaviour and reciprocity. In Tyler and Tang's [19] study of corporate e-mail practices, workers were seen to regulate their e-mail use – especially the message style, content, and response speed – in order to

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maintain their ‘responsiveness image’. Workers maintained these images in order to evoke preferred expectations concerning their availability. Short e-mail messages were used to signal intentions to reply with a longer message later. This way, the workers decreased response latency – a property that Liu et al. [11] and Jacobson [9] have found to be detrimental to how one is seen in others’ eyes and to decrease the understandability of one’s intentions.

When one considers more synchronous CMC than e-mail, more phenomena emerge. In a study of instant messaging (IM) in a workplace, Nardi et al. [12] found that, in addition to selectivity in accepting people for IM clients’ buddy lists, conversational availability was communicated through ‘outeraction’ – handshakes that addressed the suitability of the situation for communication. Sometimes recipients did not answer at all or did so with a delay. This was enabled by the inherent ambiguity and contextual opacity of the communication medium, which provided the users with *plausible deniability* of their presence: a grey area of possibilities that could legitimately explain their non-responsiveness.

Aoki and Woodruff’s study has shown ways in which ambiguity and plausible deniability can be used as conversational resources, making it possible even to be untruthful and provide ‘white lies’ if needed [1]. The authors draw from research in ethnomethodology [3,7], which has shown that acting in an explainable – or *accountable* – manner is a crucial requisite of smooth social interaction. Anything that is out of the ordinary comes with a requirement to provide an explanation and gives the others a legitimate reason to ask for one. Plausible deniability does not relieve people from being accountable for unavailability but does allow deception [5] and relaxes the requirement to give truthful or detailed explanations [1,12]. Systems differ in their guidance with respect to how users should follow the rules of interaction [2].

In the case of mobile phones, the methods for managing one’s unavailability are even more varied than in the channels discussed above. Licoppe and Heurtin [10] have described the levels of selectivity in people’s practices for distributing their phone number(s). Most users are rather selective and prefer reciprocal exchanges in which they receive the other person’s number in return.

Being unavailable does not mean that calls are never answered. One can also answer and state that one is unable to talk. Weilenmann [20] analysed the ways in which availability is communicated at the start of a call. She found callers to offer call-recipient a turn in conversation that allowed informing about availability and closing the call smoothly if so required.

In addition to the above-mentioned methods, unavailability can be managed by leaving the phone at home, muting it, or shutting it down. In Sadler’s study of freelancers [14], however, these options were rare. A more common solution was to send advance notices of upcoming periods of

unavailability. Looking at the frequency of different methods in quantitative terms, Haddon [4] conducted a survey of methods for dealing with incoming calls (blocking the call, not answering, getting someone else to answer, and advising people to avoid calling at certain times). Each of these strategies on its own was rarely used, but things change when they are considered together: 13% of the respondents used at least one of these strategies often, and 46% used them ‘sometimes’.

In view of these findings, the research to date about unavailability and mobile phone use paints a fragmented picture. The phenomena observed with other CMC technologies (e.g., impression management, plausible deniability, and reciprocity) have not been studied in the context of mobile phones, and two aspects have remained unaddressed in those studies that do focus on mobile phones: First, the general relevance of unavailability is unknown: we don’t know how often users are unavailable in mobile communication in general, or in what ways (phone off, not being answered, etc.). Second, different forms of unavailability have been described separately in different papers, and, therefore, some forms may have been ignored altogether. An integrated picture is missing.

In particular, to our knowledge, no studies exist concerning unavailability management outside the actual conversation situation – for example, on situations in which a phone is not answered at all. For instance, Nardi et al., [12], Aoki and Woodruff [1], and Hancock et al. [5] in their studies have focused mostly on management during conversation.

RESEARCH DESIGN

The study presented here focuses solely on mobile phones, because of their importance and pervasiveness in personal communication, which render them a central element also in the situations having to do with unavailability. Moreover, mobile communication embodies an inherent tension: it provides access to people at (virtually) any time, anywhere, but at the same time makes them vulnerable to communication attempts at inopportune moments.

The methods were focused on all communication attempts that did not lead to picked-up calls, from powering down completely to calls rejected by a user’s press of the ‘red button’. Also text message events were logged, to illuminate how these two communication methods interact with each other. With this emphasis in mind, we decided not to record the speech in successfully connected calls or store the actual content of messages received or sent. Two cases, therefore, are de-emphasised in the analysis: the use of text messages to manage unavailability for phone-call access (e.g., advance warning) and verbal management of unavailability in situations in which a call was answered but finished immediately. Finally, it was technically impossible, unfortunately, for us to extend the logging to other communication channels, such as social networking sites (SNSs) and chat.

Events for person demo

Instruction:

Enter descriptions into the fields about each event, describing in detail what happened. Be as precise as you can. When finished, click the button in the end of the page.

You have the following events to describe:

Wednesday 20.1

Time	Duration	Your description
17:31		<p>You received a call from person John Smith (+35850111222333), but rejected it</p> <p>Where were you and what were you doing?</p> <p>Why did you decide to reject the call?</p> <p>If you contacted the caller at a later time, how did you do that?</p>
17:35		<p>You received a text message from person John Smith</p> <p>Where were you when you noticed the message and what were you doing?</p>

Figure 1. Screenshot of the Web-based questionnaire.

Data collection

The study was carried out in December 2009 – February 2010. At the beginning of the study, each participant filled in a pre-trial questionnaire and signed an informed consent form. Also, purpose-written logging software was installed on the participant's existing phone. This was followed by a 13–30-day trial period (average: 19.4), during which the participant was asked to use a Web-based diary each evening. After the trial, each participant was interviewed.

More precisely, the data collected in this study consisted of the following components:

- *Pre-trial questionnaire:* Participants were asked about their demographics, phones and phone types, and communication frequencies via various Internet services.
- *Usage logs:* On participants' phones, ContextLogger2¹ (CL2) was used for unobtrusively gathering timestamped data about incoming and outgoing calls (excluding the audio), text messaging (excluding message content), silencing and other profile changes, and phone start-ups and shutdowns. CL2 is a data collection tool for smartphones running Symbian S60 3rd and 5th Edition operating systems [6]. The software is available as open source and consists of a logger 'daemon' and a set of supporting programs and libraries. These components enable automatic background recording of the use and context of the mobile client. With respect to calls, CL2 logs how the call was initiated, connected, and closed, making it possible to identify unanswered calls, normally connected calls, calls received while the line was engaged, etc.
- *Web-based diary:* The logs gathered with CL2 were uploaded every evening at 5pm to a server, which stored them in a SQL database and also automatically populated

¹ See <http://www.contextlogger.org/>.

Event type logged	Information shown to participant	Questions
Outgoing answered call	Time Name and number of the person called Call duration	Where were you, and what were you doing? Why did you decide to call, and what was the call about?
Outgoing unanswered call (busy / not connected / given up by caller / rejected by recipient)	Time Name and number of the person called	Where were you, and what were you doing? Why did you decide to call? Did you try to reach the person in another way later?
Incoming answered call	Time Name and number of the caller Call duration	Where were you, and what were you doing? What was the call about? If the call was related to previous communication, what was that about?
Incoming call rejected by the participant	Time Name and number of the caller	Where were you, and what were you doing? Why did you decide to reject the call? If you contacted the caller later, how did you do so?
Incoming call not reacted to by the participant	Time Name and number of the caller	Why didn't you answer the call? If that was intentional, where were you and what were you doing? If you contacted the caller later, how did you do so?
Incoming SMS	Time Name and number of the sender	Where were you when you noticed the message, and what were you doing? What was the message about? Was the message related to previous communication? If you reacted to the message, what did you do?
Outgoing SMS	Time Name and number of the recipient	Where were you, and what were you doing? Why did you decide to send a text message? Was the message related to previous communication?
Ringling profile change	Time Profile name	Where were you, and what were you doing? Why did you decide to change your profile?
Phone shutdown	Duration of downtime Time of switching on	Where were you, and what were you doing? Why was your phone shut down? Did you somehow cater for those who might have tried to reach you?

Table 1. Questions presented to participants in the web diary.

online diary forms with them, for gathering descriptions of use events (see Figure 1). For each kind of use event, specific questions were presented (shown in Table 1).

- *Interview:* At the end of the trial, participants were interviewed on the basis of full printouts of the use event

Event type	Number of events	Subset related to unavailability
Incoming calls		
Answered	564	0 (0%)
Unanswered (given up by caller)	186	176 (95%) ¹⁾
Unanswered (rejected by participant)	17	13 (76%) ¹⁾
Total (incoming calls)	767	189 (25%)
Outgoing calls		
Answered	439 ²⁾	0 (0%)
Unanswered (phone not found in network – e.g., shut down)	40	35 (88%)
Unanswered (busy)	10	10 (100%)
Unanswered (given up by participant)	124	107 (86%)
Unanswered (rejected by the recipient)	15	13 (87%)
Unanswered (unclassifiable) ³⁾	6	-
Total (outgoing calls)	634	165 (25%)
Text messages		
Received	589	212 (36%) ⁴⁾
Sent	468	- ⁵⁾
Total (text messages)	1,057	212
Profile change	457	218 (48%)
Phone turned off	68	19 (28%)
Sum total	2,983	803 (27%)
Unidentified events (logging errors)	50	-

¹⁾ Not all unanswered calls were classified as unavailability; we excluded all ‘pocket calls’, attempts to locate one’s phone by calling it, and calls of the sort mostly used to exchange phone numbers between two people.

²⁾ The number of calls connected successfully may, in principle, include calls made to hear one’s voicemail messages. This is, however, unlikely in practice, since leisure-time voicemail use is rare in Finland and no indication of its use was encountered in the study.

³⁾ In unclassifiable cases, the phone provided an incomplete connection code sequence, precluding classification.

⁴⁾ This refers to messages that the user received but did not reply to. However, it was not possible to tell from the data which messages were explicitly requesting a reply.

⁵⁾ From the data, it was not possible to tell which sent messages pointed up unavailability on the part of the recipient.

Table 2. Mobile phone use events and the proportions of unavailability in each event type.

histories and Web-based diary responses. All situations of possible unavailability were discussed in more detail. The end of the interview was semi-structured and focused on feelings of being accountable to others for one’s unavailability, the reactions when another person could not be reached, possible effects of unavailability on the impression one leaves on others, and the use of plausible deniability in managing one’s unavailability.

The reason for having logs followed with Web-based diaries that, in turn, were followed by interviews was that this approach created a pipeline of methods that gathered data with increasingly detailed information about circumstances of unavailability. Another purpose was to maintain a link between objective quantifiable data and qualitative interview data.

Participants

The participants were 20 individuals, all from Finland’s Helsinki metropolitan area. One of the participants was working full-time, while the remaining 19 were students at a university, though two of the latter also were working full-time and nine worked as shop clerks or course tutors (on average, 7.6 hours a week). Five were female and 15 male, and the average age was 25.1 years. On average, the participants were in their fifth year of university studies. All participants had a private Nokia phone (as this was necessary for installation of CL2).

Although it had not been our intention, over the course of the research it became evident that the participants were technologically savvy people. In the Discussion, we will address how this may have affected the findings.

Data Analysis

For the quantitative analysis, the data were cleaned up via deletion of events not directly related to the study, which left 2,983 events. For the qualitative analysis, the interviews were first transcribed and then subjected to qualitative content categorisation and analysis. The analysis was data-driven, so that analyses would spawn new hypotheses about possible unavailability categories, which were subsequently verified through data from the log.

The analysis began with examination of the overall importance of unavailability in mobile communication. To quantify the extent, we defined unavailability to cover the following events of use, by event type as labelled by CL2 and participants’ Web-based diary and interview entries:

- Switching the phone off or setting it to be silent or beep
- Not reacting to received text messages (i.e., neither calling back nor sending a reply message)
- Not answering an incoming phone call, or rejecting it with the ‘red button’
- Not being able to reach another person, as evidenced by unanswered calls, hang-ups, and calls to busy numbers

RESULTS

The results in Table 2 show that mobile phone unavailability affected mobile communication fairly often among the participants. Of the 2,983 events, 803 (26.9%) were classified as signs of unavailability or user actions aimed at achieving unavailability. This percentage represents, however, a combination of many event types, including both synchronous communications (i.e., phone calls) and asynchronous communications (i.e., messaging), as well as other events (i.e., profile changes and shutdowns). Below, we focus mostly on phone calls – the data that had been logged in the most detailed manner.

Looking at Table 2 and phone calls alone, one finds that 25% of the events were unavailability-related. The analysis later in the paper shows that 56% of unanswered incoming calls were followed by a reciprocal outgoing call by the person called. Adding 56% of 189 (the number of

unavailability-related incoming phone-call events) to the unavailability-related calls, then calculating a new total ($189 + 165 + (0.56 * 189) = 460$) and its percentage out of all phone call traffic ($767 + 634 = 1,477$), we find that *31.1% – about one-third – of the phone call traffic among the participants consisted of unsuccessful attempts or their remedies*. Clearly, therefore, unavailability was a frequent phenomenon in mobile phone use among the participants.

Individual participants' unavailability frequencies were analysed in order to assess the possibility of data from one very active participant biasing the results. On average, the participants received 0.4–3.6 phone calls each day (mean: 2.1, median: 2.2) and made 0.6–4.4 phone calls (mean: 1.7, median: 1.4). For SMSs, frequencies per person for received messages were in the range of 0.2–6.8 (mean: 1.6, median: 1.0) and for sent messages in the range of 0.2–5.3 (mean: 1.3, median: 0.9). The largest values were from the same participant, without whom the maximum frequencies would have been 3.1 and 3.5. Had he had an exceptional unavailability percentage for incoming text messages, the overall percentage would have been biased, but this was not the case – the percentage was very close to the average of the other participants. Participants shut their phones off 0.0–0.6 times a day and changed the call profile 0.0–3.4 times a day. Therefore, no outliers were found in the data that would have biased the results. No-one appeared to use voicemail; in general, it is a rarely used service in Finland.

Categories of Unavailability

For substantiation of the quantitative results with users' explanations, the events related to incoming phone calls, profile changes, and shutdowns tagged as unavailability-related were selected for more detailed analysis. This was a corpus of Web-based diary answers and interview-based vignettes of 218 profile changes, 13 rejected phone calls, 176 unanswered incoming phone calls, and 19 phone shutdowns (426 events in total). Four different categories – unavoidable, enforced, intentional, and negligent unavailability – were found. Ten events were omitted from this categorisation because of insufficient data.

Unavoidable

Unavoidable unavailability – denoting those situations over which the user did not have control – was fairly common among the participants (113 events, or 27% of the total; 110 incoming calls). Such events were either *user-generated*, when they resulted from an earlier intentional decision for non-use (e.g., a user who had muted the phone or hidden it in her bag could not hear it ringing) or *external* (e.g., a user being unable to hear the ringing because of background noise). The three most common situations were not hearing one's phone ringing, not having enough time to answer, and being asleep and having the phone in silent mode.

Enforced

In 150 events (35% of the total; 39 incoming calls), the user decided, for external reasons, not to answer the phone even if doing so would have been possible technically. The reasons were mostly of two types. *Conformance to the*

social norms of the situation was the most common explanation. It was associated especially with meetings, lectures, and appointments and usually involved muting the phone. When the phone was muted, the subsequent communication attempts from other people led mostly to unavoidable unavailability.

The other type of enforced unavailability was related to *practical inconvenience* of investing effort in answering. For instance, many participants driving a car would not stop to answer a call. Others knew that if they were in busy traffic and received a call, hearing the other person's voice would have been difficult anyway, and they subsequently did not answer.

The remaining two categories – intentional and negligent unavailability – are presented in more detail, because they represent situations involving more deliberation and more freedom, and therefore also a wider selection of methods of managing unavailability.

Intentional

Intentional unavailability – denoting those events in which the users exercised their own will in deciding not to respond to communication attempts of others – was also common, accounting for 147 events (35% of the total; 35 incoming calls). However, 89 of these events were related to muting or shutting down the phone when going to sleep. The logs showed that some participants did so every night.

The remaining reasons represent many types of situations. Just *being free of interruptions*, independently of what one was doing, was aspired to quite rarely, since only four cases of muting or shutting down the phone for this purpose were found. However, the participants mentioned 30 situations of some activity, ranging from yoga meditation and revising for an exam to more 'active' use of time such as playing a computer game, having a good time with other people, cooking, or working, in which they had a *preference for the ongoing activity* and did not want to be interrupted so muted the phone or did not answer phone calls. Usually no other people were taking part in these preferred activities, but if they were, they were either individuals new to the participant or people judged to be important:

I was with some new people for the first time, and we were having a good conversation, and I realised that I had received an SMS, and I read it, but I didn't want to reply, because it would have pulled me away from the conversation. (P5 – female, 21 – in the interview)

A related situation was listening to music while being mobile and using another device and earphones. In 9 cases, the participants stated that they would not have heard the phone ringing in such a situation, which was why they had muted their phones out of courtesy for co-present others.

In seven cases, participants showed a *selective desire to not communicate with someone*, ranging from bad personal chemistry with certain people to judgements that the caller was likely to have nothing important to say, or to not being in the right mood to talk with the caller. In the interviews,

the participants in question substantiated the reasons behind these events with more general reflection:

Sometimes if my dad calls and I'm in a bad mood, I'll call him back in a little bit, because he becomes irritated if I'm in a bad mood. (P11 – female, 26 – in the interview)

[He] is a person whose calls there's not always a point to answering, because he doesn't have anything important to say. He's in the army and he is just bored. (P4 – female, 21 – in the interview, related to rejection of a phone call)

For instance, after Christmas and having been super-social, I needed some time for myself. I had the phone on silent for a couple of days and did not care about it much. (P17 – male, 21 – in the interview)

13 cases were found in which unavailability resulted from a preference for another method of contact in the very near future. Two subtypes of such non-use could be noticed. In the first, the parties were physically in the same space, and when one noticed the other, he decided to reject the call and go meet the other face to face (9 cases).

We had decided to go to eat at Unicafe [a student cafeteria]. I was already there and saw him there. (P3 – male, 25 – in the interview, about rejection of a phone call)

The other subtype (4 cases) consisted of events in which the caller was already available for communication via another medium, typically online in a chat. Then the participant could make a decision to reject the call and contact the caller by the other means.

[Where I was:] In my room, surfing the Internet. [Why I did not answer:] Because I was online and I thought it would be better to contact the caller online instead of talking over the telephone. [Did I establish contact later?:] Yes, online through the messenger. (P16 – male, 23 – in a three-part Web-based diary answer)

The few remaining cases of intentional unavailability were related to politeness toward others (e.g., muting the phone so that a flatmate could sleep), turning the phone off when on a trip abroad or sparing the battery for a later time.

While text messages could not be analysed as exhaustively as phone use, the data from interviews suggest that unresponsiveness was more common in text messaging than for phone calls. Since text messages do not require an immediate reaction, they easily allow postponing answers or omitting them altogether. Two types of intentional unavailability were prominent: *judging the topic of the message to be outdated* and *judging it unnecessary to react*:

I was at home making pastries, and when I read the message I thought that the situation had already passed. (P1 – male, 21 – in the interview)

My girlfriend sends me these 'unnecessary' text messages that are just notifications and they need not be answered or I just don't bother to. (P13 – male, 26 – in the interview)

A common denominator of intentional unavailability is that the decision not to respond is deliberate: it involves a quick assessment of the importance of the message, the nature and interruptability of one's current activity, the relationship to

the caller, and the norms of the social setting. All participants were found to engage in such deliberation.

Negligent

Finally, in only six cases (1.4% of the events; all of them incoming calls), the participants exhibited a nonchalant attitude of about always being available. This was exhibited, for instance, by leaving the phone lying around without paying attention. In comparison to selective desire to be non-responsive, which is one of the subcategories of intentional unavailability, negligent unavailability was unselective: in these events, every caller was doomed to fail in the attempt. In one excerpt, a participant hinted that he kept the phone in his pocket only if something important was expected. In another excerpt, a participant said:

I don't care that much about having the sounds on so that I would notice when someone's calling or texting [...]. If the phone isn't in my pocket, then probably nothing urgent is going to come up. (P1 – male, 21 – about his habit of having the phone in vibration-only mode most of the time)

This non-problematising attitude unavoidably resulted in calls being missed. However, in general, the participants in these situations were not indifferent to other people's communication attempts: in follow-up discussion, they said that they had almost always called back later.

These six events were distributed across four participants, suggesting that negligent use is probably not a habit of a selected few mobile phone users but something that many users engage in, although some very infrequently. The small number of situations in which the phone was left at home or otherwise unattended indicates that, in general, being able to control one's availability in different ways from one moment to another was very important to users.

How Often Users Call Back

In the diary, the third question for incoming phone calls always was an enquiry about what had happened after the unsuccessful communication attempt (see Table 1). The answers revealed that the participants were reliable in calling back. Of the 176+13 cases, 14 answers were unclassifiable (mostly for having imprecise answers), but of the remaining events, the participants called back in 56%, sent a text message in 7%, and used some other electronic communication medium (often chat) in 4% of the cases. No return call was needed in those cases in which the participants met the caller soon after (9%) or when the caller repeated the communication attempt until succeeding (7%). Accordingly, 83% of the unsuccessful communication events were remedied in one way or another. Unavailability for others proved truly occasional: it was almost always remedied soon after the participant noticed that an attempt had been made or once he or she had finished doing something that was deemed more important than answering.

We could not carry out a similar analysis of text messages, because of inability to identify messages requesting a reply (however, see [18] for an analysis of text message chains).

Impression Management

One hypothesis in this study was that recurrent unavailability would make people worried about their impression among their peers. This seemed to hold only partly. While all participants were aware of the problems that could result from frequent unavailability, they invested different levels of effort in coping with it. At one extreme were those four participants who did not find it necessary to improve their availability and instead said that they had accepted that one cannot always please others:

I think it's true that you can give some impression about yourself that is based on your phone use. I know that it irritates P. [participant's girlfriend] that I'm never reachable by phone. But I have not pondered what kind of image it conveys about me. (P17 – male, 21)

When I think about my personal phone use and how I answer and call back, I don't think that I'm leaving a very pleasing image. [...] When I answer with a delay, I'm not purposely trying to build some kind of image as busy or a bigwig, but that's how it goes. [...] I don't think others have an issue with it [...] Those I communicate with are my friends. (P7 – male, 27)

I may be a slightly harsh phone-user in that I don't always reply to all messages even when I could do so. [...] But usually those that I am harsh with are my friends and I assume they know me and that I don't need to pretend to be anything other than I really am. With less familiar people or in some other things, I try to handle them [better]. (P11, female, 26)

At the other end of the spectrum were those who actively managed their availability and responsiveness in order to invoke a positive impression of themselves:

I usually try to answer quickly, which tells others that I'm courteous. It can also give a signal of that I'm reliable. That's a good image to provide to your friends as well. (P8 – male, 33)

I could imagine that I usually answer. Like, if there's a person with whom you wouldn't like to talk right at that moment because he's going to talk for hours and hours, then I'm not going to answer. [...] But I answer almost always when someone calls. I think that gives a good picture of me if I usually answer. It's a positive thing if you can be contacted. (P2 – male, 23)

At this end of the continuum, the participants managed their availability in a very similar way to the users of e-mail in Tyler and Tang's study [17], cited earlier. Also here the participants embarked on phone-use practice that would portray a certain image of their responsiveness. However, Tyler and Tang's study was carried out in a workplace context where the participants seemed to consider the effect of responsiveness in their professional role (e.g., whether the participant was leaving an impression as a good team member). In the present study, the deliberations dealt with personal rather than work-oriented characteristics. This was probably the factor that made the findings more varied.

Creating Space for Plausible Deniability

The previous research has stated that communication media that provide limited visibility of the other person's context

afford plausible deniability: being unresponsive does not require detailed or truthful explanations [1,12]. This applies also to mobile communication. However, since people usually carry their phones with them all the time, the likelihood that an incoming call would not be immediately noticed is usually low.

As also noted above, plausible deniability does not mean that one would be freed from accountability for one's unavailability. Rather, it means that providing explanations becomes easier. This was apparent from the data: 13 of the 20 participants said that they felt a duty to explain unanswered phone calls upon the next contact. Some of them, however, confined this responsibility to attempts by certain important others or cases in which establishing communication had seemed important to the other person. The same 13 participants also expected some kind of explanation from the people they themselves had failed to reach. Explicit enquiries were, however, rare, used only in situations in which repeated attempts had been needed.

About half of those 13 participants who felt a need to explain admitted resorting to white lies in their explanations. According to them, giving an explanation for unavailability is a sign of taking others into consideration. Explanations, even ones that aren't entirely true, were regarded as symbolic acts of showing the other person that his or her time was valuable and that the effort to get in contact had been acknowledged. Interestingly, it seemed that explanations were used to convince others that they had not been targets of intentional unavailability, even if they, in actuality, had. This was evidenced by the need to give the following kinds of socially acceptable explanations:

And sometimes, if I'm honest, I don't dare to say that I just didn't feel like talking, even though there is nothing wrong with saying so, so in cases such as this, you just throw out some kind of emergency lie, saying that you were in the shower or whatever. (P7 – male, 27)

Then if someone calls and I don't bother to answer then, I don't say 'sorry I didn't bother to answer' but, like, 'hey, sorry I couldn't hear the phone' or something. (P4 – female, 21)

The other six participants (one participant said that he did not have an opinion) said that they did not feel a need to provide an accounting for unavailability and did not expect one from other people either. A common opinion was that, because everyone knows that people often are busy, no explanations are necessary. If such were provided, they would be banal and mundane anyway:

Usually you just assume that other people have something going on like a lecture or work and that is why they don't answer. (P11 – female, 26)

The fact that six participants had decided not to provide their own explanations and remained uninterested in the true nature of the other person's unavailability, while 13 found it necessary to explain (of which six admitted nevertheless providing white lies), opens up an interesting viewpoint on how the participants handled the tensions

related to unavailability and its explanations. It appears that *a veil of ambiguity was deliberately maintained between the participants and others*. Participants were well aware that the accounts provided were not always truthful, yet they were still accepted. This is evident in the following quotes:

Giving an explanation, even a fake one, is part of good manners, something that is learnt through socialisation. The reason given doesn't have to be anything complicated, so just saying that one didn't hear his phone or something similar is sufficient. The reason given doesn't even have to be true, but it does have to be socially acceptable. (P4 – female, 21)

No, I don't expect [others to explain their unavailability]. It's none of my business what the other person has been doing, and in any case there are millions of reasons so if you start asking, will you get the real answer, and what significance does it have for me? (P12 – male, 47)

The data suggest that the most active phone-users in particular were also active in accepting and maintaining the ambiguity. One less active participant, however, associated it with 'playing games' and, while recognising the potential of the flexibility provided, seldom made use of it.

One reason for the attitude of tolerance toward white lies and imprecise explanations might lie in the high percentage of the unsuccessful communication attempts that were rapidly rectified. Hearing the truth may not be important if the topic of interest can be discussed after only moderate delay. With other communication media in which the response latency is greater (e.g., e-mail) or in situations in which making a phone call has been discussed in advance, ambiguity may be maintained less often. Further research may be warranted to investigate this possibility.

Circumventing Unavailability through Other Channels

Logically, it follows that one can sometimes also be a target of others' unavailability. When finding themselves in such situations, the participant chose between alternatives of further action. The first option was to wait until the other person called back, which, in view of the results cited above, usually proved successful. In their answers to the Web form question 'Did you try to reach the person in another way later?', people replied 'no' 53% of the time, finding it sufficient to wait for him or her to call back later.

Alternatively, the participants could decide to try contacting the desired person again. This option was chosen in 35% of the cases, leaving 12% of the answers unclassifiable. Of those who attempted contact again, only 58% mentioned a mobile phone and 21% did not specify the medium used. This means that in only 17–28% of the cases was an unsuccessful call followed with a new call attempt.

Therefore, a third circumvention method was popular too. This involved channelling the new attempts to other CMC channels that were popular among the participants. In the pre-study questionnaire, it emerged that e-mail, Facebook media, and chat (MSN messenger, IRC, Facebook chat, or Skype chat) were used daily by 17, 12, and eight of the 20 participants, respectively. Only two participants could not be

reached via these channels within 24 hours. Mobile phones were, therefore, but one technology in a larger CMC system.

In circumventing someone's mobile phone non-use, one had to know which alternative channel to use, but this did not seem to be a problem for the participants. In fact, the choices were *stratified* in that a dedicated communication medium was preferred on a per-person basis. A bigger problem for the participants was that the persons of interest were not always available through the preferred channel:

Then again, 95% of the people I know don't hang out on the Internet, so it's a pretty small sector... Mostly people from the computer science department or other nerds. (P15 – male, 27)

In addition, some conversation topics were not regarded as suitable for other media. The interviews indicated that conversations on the Internet tended to be less focused than mobile phone conversations, which appeared to be more task-oriented, and could be addressed to multiple people:

If I use the net instead of a mobile phone, then the issues aren't as important. So it [the net] is for small talk. Without it, there would be no contact. (P19 – male, 24)

Then it [IRC] is a kind of bulletin board, like 'hey, I'm going to this place to eat at noon, so come along if you want'. (P9 – male, 30)

The various communication media, therefore, are used selectively and opportunistically, forming a system of parallel channels for communication, with each channel having its merits and hindrances both for the person seeking contact and for the person being contacted.

DISCUSSION

While the findings presented have been obtained from a group of participants of whom most were students, unavailability may be a big phenomenon in mobile phone communication also more generally. As much as a third (31.1%) of the phone calling was unavailability-related, consisting of either unsuccessful attempts or calls back from the previously unavailable person. We found four categories of unavailability, varying in the degree of the user's ability and willingness to answer:

- Unavoidable unavailability (27%): situations in which the phone call or a message beep simply cannot be heard
- Enforced unavailability (27%): social situations in which answering is not seen as appropriate
- Intentional unavailability (35%): activities in which the user needs to be free of interruptions, such as sleeping, or prefers other activity to communication
- Negligent unavailability (1%): a rarely observed uncaring attitude toward being available, as in habitual forgetting of the phone at home

Calls were only very rarely turned down on a per-caller basis or not reacted to with a reciprocal call. Interestingly, no such category was found as 'accidental unavailability',

in which the participants would have been unhappy about having missed their peers' communication attempts.

Because no-one can be available at all times, strategies for managing unavailability had been developed for handling the sometimes uneasy explanations for unresponsiveness. In particular, the users in the study were *making space for white lies* so that the reasons for unavailability were quickly settled upon the next time successful contact occurred.

On the other hand, unavailability is not always respected, since participants were sometimes hunted down through other communication channels when they had been unavailable for mobile-phone-based communication.

Generalisability

Generalising these findings to a larger user population is, however, problematic because the participants in the study were mostly tech-savvy young adult users whose SMS and phone-call communication amounted generally to only a couple of events per day. Further studies are needed, on other age groups, work settings, and more active mobile phone users. Also, occasional unavailability may be different in synchronous (e.g., calls – the primary focus of this study) and asynchronous (e.g., SMS) communication.

Another unaddressed issue is the interplay of the ways in which interruptions, unavailability, and impressions are managed and balanced – which could have been observed in a study of heavier users. By contrast, the users in our study had distributed their communication across multiple channels, particularly to Internet-based SNSs and instant messaging systems. Migration to a larger number of communication channels is a general trend across a larger user population and should also be addressed in future research. Below, we discuss our findings with this trend in mind.

Unavailability in Future Multi-Channel Communication

Communication through parallel channels differs from single-channel communication in the increased control that it provides to the persons being contacted. With more channels at hand via the same device, users can be more selective in who knows their contact details, which channels are kept open, and how often they are checked. In being mostly messaging-based and asynchronous, the Internet-based channels especially widen the time windows within which replies may be provided acceptably to the contacting party.

The improved control over distribution of contact details, choice of available channels, and timeliness of replies increases the room for plausible deniability on the part of the person being contacted. With these changes, 'caller hegemony' turns into 'contacted hegemony'. On the other hand, the new Internet-based channels usually provide availability indicators for other users concerning one's online status. This simplifies 'hunting a person down' and provides more tools for those who want to establish communication, thereby creating a counter-force to the trend of increasing plausible deniability. Therefore, while

the room for unavailability is becoming greater, users also gain more methods for interrupting each other.

When more communication channels are in use, more communications between people will be in a pending state, and users may find it harder to remember who has been contacting them and regarding which issues. Responding becomes more difficult also since the same channel may not be open at a time when the user would be free to respond. Then the roles are reversed: the person who previously was unavailable may now have to start seeking a suitable channel in order to contact the other person.

These kinds of unavailability-related problems have not been fully addressed in today's communication systems. The most common solution for managing unsuccessful incoming communication attempts has been to aggregate different channels into a single system so as to provide users with overviews of their ongoing communications. This was implemented in Google's Wave service, and the recently released RockMelt Web browser uses the idea as well. RockMelt's sidebars show activities for networking sites such as Facebook and Twitter. However, RockMelt is more suitable for checking 'what is going on' than for telling how others have been trying to get in contact. Cross-channel presence indicators could serve this purpose better. Upon a reply, the user could see an overview of the other person's presence statuses in the channels that the two share and could then choose the one in which the other person appears to be available. This would simplify reciprocating other users' communication attempts.

However, by simplifying the search for the available channels, such designs also simplify the above-mentioned 'hunting' and make it harder for a user to remain uninterrupted when that is really desired. In particular, cross-channel presence indicators should allow selective blocking and not hint toward a norm of the maximum number of a user's channels being kept open all the time by default. Otherwise, the benefits of having channels with greater cumulative coverage but that are different are lost.

In some situations, the user may be able to notice the communication attempts but may not be available or willing to respond. These situations too can be supported technologically. For example, Nokia phones provide an opportunity to send a predefined SMS to a caller if answering is not possible. The content can be tailored by the user, but there can be only one predefined message at a time. The same text does not fit all situations, a fact that supports management of unavailability on a very coarse level. The Quiet Calls system, by Nelson et al. [13], enabled responding to phone calls in more varied ways, using an easily learnt key-press menu, but it has not been evaluated in a field trial. Approaches like these, also in other channels than mobile ones, warrant attention in future research.

The excerpts presented in this paper show that the participants took the consequences of their unavailability seriously. The high percentage of returned calls shows that

they did their best in trying to remedy past unsuccessful communication attempts. We also found that users managed their communications and unavailability by using strategies that would not always be obvious to their peers. Design should, therefore, as a general rule, foster users' forgiveness and understanding of each other's attempts to manage personal communication.

Unavailability is a real but subtle issue in CMC. This paper has both investigated its prevalence in everyday communication and provided suggestions concerning how to ease the problems arising from its management, keeping in mind users' orientation to the ways in which occasional non-responsiveness needs to be explained.

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