

Understanding Family Communication across Time Zones

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ABSTRACT

Nowadays it has become increasingly common for family members to be distributed in different time zones. These time differences pose specific challenges for communication within the family and result in different communication practices to cope with them. To gain an understanding of current challenges and practices, we interviewed people who regularly communicate with immediate family members living in other time zones. We report primary findings from the interviews, and identify design opportunities for improving the experience of cross time zone family communication.

Author Keywords

Family communication, time difference.

ACM Classification Keywords

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General Terms

Design, Human Factors.

INTRODUCTION

The last century has seen vast advances in both transportation and communication technologies, shrinking the world into a “global village”. As a result, not only do people more frequently travel and communicate internationally in work settings, but it is also increasingly common for members of the same family to be living in different regions, countries, or even continents. For example, grown-up children leave home to study abroad; spouses work for companies in distant locations; siblings pursue different life paths around the world and so on. Communication tools including telephones and email can in some sense render the distance irrelevant – reaching your family halfway around the world can be just as immediate as if they were living in the same city. The recent prevalence of internet technology has also made such long-distance communication accessible and affordable on a daily basis. Distant family members have never had as many ways to communicate as they do today.

However, the immediacy of modern communication technologies also highlights one specific factor in long-distance family communication – the time difference. Being geographically far away from each other often also means the family

members are living in different time zones. Calling your parents becomes tricky when their day is your night; text messages to loved ones might be read half a day later; and when you have something exciting to share with your family, there is simply nobody awake to hear about it. This “time distance” seems to pose more challenges than geographical distance for communication between distant family members. Understanding these challenges, as well as how people currently deal with them, can guide us to design better communication tools to suit the needs of families living across time zones.

As a first step towards this goal, we conducted an explorative study by interviewing 14 people who regularly communicate with immediate family members living in other time zones. We report findings about their current practices and challenges surrounding this issue, and propose opportunities for improving future designs of family communication tools.

RELATED WORK

Communication and connectedness between remote family members has recently attracted much research interest. Tee et al. [9] studied people’s current usage of technologies to communicate with distant family members, and highlighted important design tradeoffs such as between awareness and privacy. Kim et al. [3] present an exploratory study for developing digital appliance concepts to enhance communication between both remote and co-located family members. Several systems have been designed to facilitate new forms of family communication. For example, SPARCS [1] is a prototype that encourages frequent sharing of photos and calendar data between extended families. HomeNote [8] is a device that supports situated messaging from and to the home through text or scribbling. MessageProbe [2] enables distributed family to communicate using digital Post-It notes.

In particular, investigations on family communication have identified time difference as an important factor. Modlitba and Schmandt [7] found that parents travelling to other time zones adjust their schedule to suit the bedtime of children at home. In the study of BuddyClock [4], a device that shares sleeping status between family members, time difference was reported as a potential reason why such information would be needed. Lottridge et al. [6] reported remote couples taking time differences into account to predict the partner’s availability and whereabouts. Time differences can also cause behavior changes. Lindley et al. [5] reported that time difference was one of the challenges that contributed to older adults’ adoption of asynchronous communication methods such as email. Zerubavel [10] also discussed the social impact of time and time zones in general. These findings justify the need for dedicated research on family communication across time zones, of which our work is a first step.

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STUDY METHOD

In this study we sought to obtain an understanding of current practices and challenges surrounding communication between family members living in different time zones. The data were collected using semi-structured interviews. Fourteen people (5 males, 9 females, aged 25-61) from 12 households (including two households that were related) participated in the interview. All participants regularly (ranging from daily to biweekly) communicated with one or more immediate family members (parents, spouse/partner, or children) living in other time zones, with the time difference ranging between (\pm) 3-12 hours (disregarding date change), large enough to have an impact on communication. For a more holistic understanding, we included participants currently living in 4 different countries / time zones: UK (Cambridge/London, GMT), US (Seattle, GMT-8), Canada (Toronto, GMT-5), and China (Beijing/Shanghai, GMT+8). The family members they communicated with lived in locations covering 9 different time zones in total. Some participants (e.g. grown-up children) had moved from their place of origin and communicated with family back in their original time zone; some (e.g. parents) remained in their native location and communicated with family in other time zones; and for some (e.g. couples) both parties had moved away from their home time zones. Participants' occupations include teacher, researcher, student, IT professional, businessperson, housewife, and retired, resulting in a variety of daily schedules that may influence communication behaviors.

Interviews were conducted in person or over the telephone. Participants from the same households were interviewed together. Each interview lasted about one hour. Participants were asked to describe their communication experience with each regularly contacted family member in other time zones, such as communication methods, coordination strategies, etc., and to compare these experiences to same-time-zone family communication where applicable. All interviews were recorded and transcribed. The transcripts were carefully examined to extract themes. Interviews revealed many interesting communication practices between distant family members in general, however in this paper we focus on reporting findings directly related to time difference.

FINDINGS

Time difference was considered a challenge for family communication by all participants. The main difficulty came from the misalignment of daily schedules between the two parties of communication. Unlike families living in the same time zone whose daily schedule and availability for communication may roughly match, cross time zone families relied on the intersection of their leisure times which are shifted by the time difference. This results in a much smaller and somewhat rigid time window available for communication. Participants reported that they adapted their communication practices to address this challenge, as detailed below.

A Reliance on Synchronous Communication

A variety of communication methods were used by participants to connect with their families, including both synchronous methods such as telephone and internet audio/video call (e.g. Skype), and asynchronous methods such as email or

text message. Despite the difficulty posed by time difference, synchronous methods dominated family communication for most participants. This was explained by the nature of family communication, the content of which is mainly emotional contact and catching up about daily life, rather than functional information exchange. Being able to hear/see the person's voice/face, as well as the real-time interactivity in audio/video conversations proved essential for the sense of presence, connectedness, and dedication between close family members, compared to which the actual communication content can be secondary. As an extreme example, some couples would leave a live audio/video link on without actually talking to each other, solely for the feeling of presence. These audio/video calls were treated as a dedicated activity and always happened at people's homes. The typical length of a conversation varied from 10 minutes to about 1 hour for different participants. Similarly, instant messaging, as the middle ground between synchronous and asynchronous communication, was more often used synchronously in dedicated chat sessions.

By comparison, asynchronous communications were recognized as more flexible because they only required one party to be available, and therefore could be initiated outside the "communication window" dictated by the time difference. However, in practice these were used much less frequently than synchronous communication methods for the reasons mentioned above. Our participants said they would often rather wait to make a call, rather than opting to send an asynchronous message. This was reportedly in contrast with cross time zone communication in work settings, where email or voicemail dominates either for the actual communication or for negotiating the communication time. In family communication, we found asynchronous communications were mostly used either to make up for a missed or long overdue call ("*If I have been really busy and haven't had time to call them... I drop them an e-mail*"), or to coordinate a future call.

Coordination through Learning about Routines

This preference for synchronous communication requires coordination in finding the time slot to accommodate family members in both time zones. However, different from work settings where people may carefully set up the time beforehand for international phone calls, we found that, in the family environment, the actual communication time was almost never negotiated in advance. Instead, our participants relied on implicit "soft routines", where a relatively regular time window was informally recognized by both parties as an appropriate time within which to call, e.g., 10-12am for one party and 6-8pm for the other in the case of an 8-hour difference. However, the precise time of the calling was not fixed. The call could be initiated at any time during the "communication window". People tried to make themselves available during the communication window, and would inform the other party in advance if they would not be. Sometimes, IM status was also used to reconfirm availability during the window, especially if the call was going to be made using the computer itself. In most cases, these communication windows were during the weekend since there was a larger range of free time to choose from for both parties, naturally leading to a weekly communication pattern. For families with a large

time difference (e.g., >5 hours), the intersection of leisure time on workdays was often nonexistent or too short to be feasible. Depending on the time difference and participants' daily schedule, the length of these communication windows varied from 1-2 hours to half a day.

Such communication routines gradually emerged over time, but were never explicitly agreed on. For the routine to be established, knowledge about the other party's daily (and weekly) schedule was important. All participants were able to describe the typical daily schedule of the distant family member at varying levels of detail, and they used this information to facilitate communication. For people communicating back to their original home, this knowledge mostly came from the previous experience of living together (*"It was like that when I lived at home"*). This was less useful for people communicating with family members who had moved away, since moving to a new location usually also implies many important changes in daily life routines. For them, this knowledge was accumulated through time after the move, both from the communication patterns that emerged, and from casual mentions of daily events during communication. Some participants found it surprising how much detail their parents back home knew about their daily schedule even though they had never shared it intentionally!

Although communication with family had become an integral part of their lives, participants considered it secondary to other daily routines. They typically would not change their own schedule in order to accommodate communication with remote family, except for special occasions such as New Year's Eve. Similarly, they would not try to contact their family at an inappropriate time (especially during hours of sleep) for them even if there was an urgency to talk.

Of particular interest was when participants' daily schedule changed. When the participants had to temporarily adjust their schedule or plan activities that would impact on their usual time window for communication, they almost always notified their distant family member in advance either in a previous conversation, or through asynchronous channels such as emailing or instant messaging (IM). In most cases the conversation was cancelled and people would simply wait until the next routine time, since given the time difference it was usually not easy to reschedule the conversation outside the routine window without explicit negotiation. In our study there were also four cases where people had permanent changes in daily schedule when they went through changes in life, such as graduation or retirement. *"I started out as a postgrad and my time was quite flexible... now it's clear, you know nine to five it's at work, outside of that it's at home."* In these cases, a new communication routine gradually emerged to adapt to the change, similar to how routines formed when people first moved.

As a special case of schedule change, many participants mentioned travelling as an additional challenge for communication. When one of the two parties was travelling, not only were they in an unfamiliar time zone, but also their daily schedule would become much less regular than at home. Combining these two factors, their availability for communication would become completely unpredictable for the other

party, and the established communication routine would be entirely broken. As a result, most people opted not to communicate during travel at all, or solely relied on asynchronous channels such as email. Travel also often led to the traveler being contacted at inappropriate times if the other party was not properly informed.

Being Sensitive to Time

Participants were all well aware of the exact extent of time difference between them and their family. To convert time between the two time zones, different people developed different mental systems to ease the calculation. For example, for one couple, a 16-hour difference was calculated as *"minus 8 and add another day"* by the husband, and *"day and night switch and another 4 hours"* by the wife. Most participants did the conversion in their heads, while a few used digital or paper tools to facilitate the conversion, such as displaying multiple clocks on the computer, or drawing a conversion chart. Experience living in the relevant time zone seemed to greatly help with the ability to do conversion. As a result, people who communicated with their original time zone were generally more effective with the conversion than those (especially parents) who remained in the native time zone and communicate with family members living away. For the latter, having temporarily visited the other site usually also resulted in improvements in the conversion ability. Although time conversion was usually not a big difficulty for regularly communicating family members, it was often a challenge for less-experienced older adults such as grandparents. Several participants recalled being wakened in the middle of the night by phone calls from grandparents, and *"she was too afraid to ring after that"*.

It was interesting to hear participants' thoughts about the extent of time differences in different time zones, especially from those who had experienced more than one. Contrary to intuition, a longer time difference was not necessarily considered worse. A "good" time difference was one that conveniently matched the leisure time of both parties. For example, a 12-hour difference, the longest possible when disregarding date change, was actually considered one of the better cases since it "matched up" free time in morning and night between the two sites. With the two time zones being exactly symmetric in the day, it also created two communication windows per day instead of one. The 12-hour difference was also one of the easiest to calculate by simply inverting the am and pm. In contrast, an 8-hour difference was considered amongst the worst cases, resulting in either party being working or sleeping at any given time on a regular workday.

When mentioning a particular time to their family members, especially for coordinating communications, all participants referred to it by converting to the other time zone, or repeating the time for both time zones. Only when the event was completely irrelevant to the other party would they refer to it by local time only. During communication, people often referred to the time as well as related activities at the remote site. This helped to set the context of the conversation, and was a casual topic of conversation to show their sensitivity and awareness of the other (*"What time is it?"*, *"Have you had dinner?"*, *"You should go to bed now."*).

Other Communication Patterns

Participants also described their experience communicating with family in the same time zone. In contrast to cross time zone communication which is a dedicated activity and has a relatively rigid routine, same time zone family communication tended to be much more flexible and ad hoc. Without the constraint of a small communication window, people reported having shorter and more frequent communications throughout the day, which happened at home, at work, or in transit. Relatively little beforehand planning was needed to choose the communication time, since people could simply check again at a later time if the other party was not available at that moment. As such, knowledge of the other party's daily schedule played a much lesser role. This resulted in different communication dynamics, where lightweight exchanges complemented less frequent intense communications, keeping the communication flow going, and providing more context and topics for people to talk about.

In this study we focused on immediate family members who communicated heavily with each other. Participants often also mentioned family members in other time zones that they communicated with less regularly, a frequent example being siblings. Especially within the younger generation, siblings usually had little obligation for dedicated communication with each other, and relied more on ad hoc communication such as through IM. As a result, time difference had less impact on their communication pattern. Instead of having knowledge about each other's schedule, IM status became the main source for them to check availability for conversation (IM chat or audio/video call). The actual local time of the other party was usually not taken into account.

DESIGN OPPORTUNITIES

Inspired by these findings, we identified two interesting design opportunities to improve current experience.

Awareness of Routine and Exception

As we found, the people in our study had good knowledge about the typical daily schedule of their distant family, which was important for them to establish their communication routine. However, whenever these daily routines were temporarily broken, the extra effort required to renegotiate the conversation time often led to cancellation of the communication. Lightweight methods to help family members be aware of exceptions could be very valuable. For example, travelers might benefit from a mobile phone that leveraged location data to warn callers of the local time during late night hours. For example, "It's 22:00 for Susan right now, do you want to complete this call or leave a message". More generally, communication tools might provide more assistance visualizing the alignment of typical daily schedule to identify otherwise overlooked alternative communication times.

Lightweight but Timely Communication

Ad hoc lightweight communication appears to have an important role in same time zone family communication, not only to keep each other updated but also to demonstrate caring. It is interesting to speculate how we might enable similar kinds of communication for cross time zone situation as well, e.g. by sending short video or voice messages. However, the content of such lightweight communication is often trivial

and only meaningful when put in the current temporal context, a possible reason why such communication was not common in cross time zone situations. We could consider an asynchronous messaging service that delays the delivery so that the message arrives at a suitable time for the receiver. For example, a person could send her spouse a voice morning greeting in her morning, and the message would be delivered when it becomes morning in the other time zone. Another possibility is to accumulate numerous lightweight messages over a day or a week, and deliver them as a collection periodically, so that subtle feelings to be communicated never "miss the moment" when they emerge.

CONCLUSION AND FUTURE WORK

Time difference plays an important role in communication between family members distributed across time zones, especially given the preference for close family to use synchronous methods. Through interviews we obtained an understanding of current family communication practices related to time difference, and identified opportunities for improving the experience. We next plan to design and evaluate tools that specifically accommodate family communication across time zones. On the other hand, in the current study we relied on self-reported data from interviews as a first exploration. In the future we would like to validate and extend the current findings with more rigorous studies such as longitude observations or diary studies, detail usage patterns of specific communication technologies across time zones, and investigate other challenges to long-distance family communication, e.g., differences in geographical, social, and cultural contexts.

REFERENCES

1. Brush, A.J.B., Inkpen, K.M., and Tee, K. (2008). SPARCS: exploring sharing suggestions to enhance family connectedness. *CSCW*. p. 629-638.
2. Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B.B., Druin, A., Plaisant, C., Beaudouin-Lafon, M., Conversy, S., Evans, H., Hansen, H., Roussel, N., and Eiderbäck, B. (2003). Technology probes: inspiring design for and with families. *CHI*. p. 17-24.
3. Kim, S.-H., Chung, A., Ok, J.-H., Myung, I.-S., Kang, H.J., Woo, J.-K., and Kim, M.J. (2004). Communication enhancer - appliances for better communication in a family. *Personal and Ubiquitous Computing*, 8(3-4). p. 221-226.
4. Kim, S., Kientz, J.A., Patel, S.N., and Abowd, G.D. (2008). Are you sleeping?: sharing portrayed sleeping status within a social network. *CSCW*. p. 619-628.
5. Lindley, S.E., Harper, R., and Sellen, A. (2009). Desiring to be in touch in a changing communications landscape: attitudes of older adults. *CHI*. p. 1693-1702.
6. Lottridge, D., Masson, N., and Mackay, W. (2009). Sharing empty moments: design for remote couples. *CHI*. p. 2329-2338.
7. Modlitba, P.L. and Schmandt, C. (2008). Globetoddlr: designing for remote interaction between preschoolers and their traveling parents. *CHI extended abstracts*. p. 3057-3062.
8. Sellen, A., Harper, R., Eardley, R., Izadi, S., Regan, T., Taylor, A.S., and Wood, K.R. (2006). HomeNote: supporting situated messaging in the home. *CSCW*. p. 383-392.
9. Tee, K., Brush, A.J.B., and Inkpen, K.M. (2009). Exploring communication and sharing between extended families. *International Journal of Human-Computer Studies*, 67(2). p. 128-138.
10. Zerubavel, E. (1985). *Hidden Rhythms: Schedules and Calendars in Social Life*: University of California Press.