Chapter **9**

Blurring the Boundaries: Cell Phones, Mobility, and the Line between Work and Personal Life

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9.1 Introduction

Up until the beginning of the twentieth century, most people lived in close proximity to the places they worked – on farms, above stores and cafés, in back rooms of schools, and in boarding houses. Co-workers were often members of the family, companions and neighbours. With the rise of modern technology – electrification, motorised transportation, communication systems – and the growing importance of the bureaucratic work organisation, the separation between work and personal life grew more definite. Commuting to work, strictures against "personal calls" at work, socialising during weekends, and having a separate "personal" or social life, are twentieth century concepts. These concepts reflect differentiation of the social meaning of places and locations – working with other employees at the office versus seeing family at home, for instance. They also reflect differentiation of the social meaning of time – the 9 to 5 workday versus the weekend. But today, wireless technologies, which help people cross space, time, activity and social networks, promise to bring us back to earlier times when the boundary between work and personal life was less distinct, and to influence the meaning of space and time. This change is somewhat of a paradox, however, as wireless technology will also take us further afield, as it increases our temporal and spatial mobility. In this chapter, we discuss how this paradox is unfolding and draw on data from a field trial of digital cellular telephony to show some of the social implications for how we work and live.

9.2 The Social Meaning and Influence of Settings

Research in the tradition of "social ecology" (Barker, 1968) has shown that different settings for social behaviour – offices, meeting rooms, homes, restaurants,

parks – sharply affect the way people act and the expectations they have of others. Mr Smith's behaviour in a meeting room and in a bar are likely to differ far more across these two places than Mr Smith's behaviour in the meeting room as compared with Mr Brown's behaviour in the meeting room. People derive the social meanings of different places, or *behaviour settings*, from a myriad of cues – their architecture and artefacts, technology used, rules in force and how most of people dress and behave (Cialdini *et al.*, 1990; Hatch, 1987; Proshansky *et al.*, 1970; Sproull and Kiesler, 1991; Stokols, 1990). These social meanings also influence people's mental schemas or models of different places and even provide scripts for what people say; more generally, they help organise people's social and work experiences (Edney, 1976). Sharing behaviour settings and acting in accord with the norms of these settings contribute to group identity, and increase people's satisfaction with their groups and their work (e.g. Newman, 1972; Baum and Valins, 1977; Edney and Uhlig, 1977). People in contiguous and similar behaviour settings tend to interact and to like one another (Moreland, 1987).

Temporal cues contribute to differentiation of social behaviour and mental models in different settings. For example, Mr Smith is less likely to stand around chatting with neighbours on a weekday than on a weekend. Temporal cues with social meaning include not only calendar and clock times, but also temporally bounded social practices such as "lunchtime". Technology has contributed to changes in the meaning of time. The dissemination of the electric light extended the "daytime" and increased the likelihood that both work and personal communication would move into the night and into less traditional locations (Melbin, 1978). More recently, the advent of computer networking, email, and the web has led to a widespread increase in after-hours work communication at home, and probably, to shorter deadlines in distributed group work as people expect faster response times.

The more legible are the cues that delineate different places, locations and times, the more clearly differentiated are they as behaviour settings and the better norms can be conveyed and obeyed (Gibson and Werner, 1994; Lynch, 1960). Consider whether airport vans and restaurants at the lunch period are appropriate for work or personal interactions. The legibility of the cues in these places is less clear, and hence less influential, than the cues associated with meeting rooms at 9.30am. Vans and restaurants usually lack office furnishings, wired telephones, clocks and other accoutrements signifying "workplace", but on the other hand, people dressed for work may populate them. Hence, although we inhabit many distinct behaviour settings, such as offices, that influence behaviour strongly, at the same time we also inhabit "mixed use" places such as restaurants, cars and public places, where the work and non-work cues may be less legible and implications for behaviour less clear.

Just as yesterday's technologies did, today's new technologies are contributing to changes in the social meaning and use of different behaviour settings, and to changes in the meaning and legibility of cues for behaviour settings. Wireless technologies (cellular phones and other wireless devices) embody a number of "affordances" (Norman, 1990) that suggest powerful social impact. First, these technologies reduce the costs and effort in communication with others; it has long

been known that reducing the costs and effort of communication dramatically increases the likelihood of communicating (Zipf, 1949; Allen, 1977; Kraut *et al.*, 1987). Second, because they are not tethered to location, wireless devices that permit communication and access to information are likely to increase personal mobility and to reduce the constraints of location on where people are at different days and times. Third, since they operate independent of location and the control of household or organisation, these technologies are likely to reduce the constraints of time. The implication of these changes is a blurring of the cues and social meanings that separate our settings for work and personal life.

9.3 One-person, One-number: The Trial of a Personal Phone

We explore these issues drawing on data from the 1993 technical and marketing trial of a new digital (PCS) cellular service carried out by the former Bell Atlantic Mobile organisation. The "one-person, one-number" service was somewhat more advanced technically than current cellular services, since it gave participants in the trial the ability to make and receive calls using one telephone number whether on their wired phones or wirelessly. When users were away from home or office, they would use their "personal phone" with its personal phone number. But when they were at home, and someone called on the personal number, the participant's wired home telephone would ring. Similarly, when the participant was in his or her office, the office telephone would ring when the personal number was dialled.

The technology used in this trial automatically forwarded to the least expensive service and clearest connection, and gave users the ability to send and receive calls anywhere, including non-local areas. The main technical difference between the cellular phones used in the trial and current cellular phones was that current phones are slightly smaller. The main technical difference between the services offered in this trial and current cellular services was the ability, in the trial, to use one phone number, and to use one's wired and wireless services interchangeably. In addition, participants could customise their network services in great detail, e.g. forward calls from the home number to the cellular phone at certain times of day and not others. However, participants in this trial generally did not use these options, and used their trial phones much as people do today. Indeed, the lack of interest in one-number service by our participants (and by participants in other trials, we suspect) may have led to its withdrawal from the marketplace. Hence, this trial is a fair representation of the cellular technology and services we see today. A somewhat more detailed technical report on the trial of this technology is given in Kiesler *et al.* (1994); see also Hinds (1999).

This study was performed before the spectacular growth and dissemination of cellular phone subscriptions to individuals. (In one decade, 1990–2000, subscriptions grew from a few to one hundred million.) The comparatively early (1993) year of this study in the life of the cellular industry gave us a chance to explore this wireless technology before it had become a normal facet of everyday life, and therefore to observe the first effects it would have on social life (see Marvin, 1990). At the time of the study, we evaluated the affordances of personal phones, and set

out to see how their use would increase communication, mobility and the likelihood of work and personal communication in work and non-work settings.

Trial participants were enrolled through work departments at Carnegie Mellon University to allow us to observe how the entire work groups responded to the technology. Three departments – Information Technology, Public Relations, and Theatre Production – containing 25, 23 and 10 participants respectively, took part in the study. Information Technology develops and maintains the computer, networking, and telecommunications operations all over campus. Public Relations manages communication with the mass media, community affairs and external publications. This department had staff in 12 different buildings. Theatre Production provides support and supervision of students in costuming, set design, electronics, lighting, woodworking and other activities related to theatre and television productions. The department put on many productions that required staff to travel off and on campus to acquire materials and supplies.

Data collection occurred during a 10-week period beginning in late January and ending in early April of 1993. Data collection proceeded in three phases, beginning on a staggered schedule one week apart for each of the three departments. In the first stage, we conducted a survey and asked all participants in the department to keep a log of all their communications and locations (including face to face) for an entire day. Everyone was interviewed the day after this communication diary. Then, the personal phones were distributed to all participants. Base stations were installed in their homes and offices, and in some cases, their cars were wired for hands-free communication. In the second stage, we conducted another survey and an audit of how participants were using their personal phones. In the third stage, we asked all participants to keep a log of all their communications and locations (including face to face) for an entire day. Everyone was interviewed the day after this communication diary.

9.4 Results

At the outset, we must explain that participants had considerable difficulty, at first, using their personal phones. The problems they encountered included the following:

- Turning the phone on and waiting for it to work (not understanding that one must "send" a connection), and hanging up (need to "end" the call).
- Figuring out how to set up and obtain access to voice mail.
- Interpreting voice prompts.
- Navigating menus and modes, especially going backwards.
- Clearing the display when making a dialing error.
- Understanding the concept and use of network customisation options, such as call forwarding and call waiting.

To overcome these difficulties, participants frequently asked for help from one another, the researchers, and the technical staff associated with the trial. Pamela

Hinds (2000) ran an experiment on the voice mail feature that illustrates the difference between what our participant-novices actually experienced and what the cellular sales force and support staff thought new subscribers would experience. These experts underestimated it would take participants only 13 minutes to learn to use voice mail, following the manual and a one-page list of "simple" instructions. Yet it actually took between 20 and 23 minutes for trial participants to learn voice mail, a difference of over 50%. Indeed, many participants ended up never using voice mail, and practically none of them used any network customisation options.

In spite of these difficulties, the overwhelming majority of the participants quickly learned to use their "personal phones" in basic mode, were extremely enthusiastic about them, and used them to make and receive on average about 12 calls per day. Participants, after receiving their new personal telephones, became more mobile. That is, they spent more time in locations away from home and office and communicated in more mixed-use settings such as hallways, homes, cars, restaurants and outside. They received proportionally more communications in these places as well. One participant took a call from the president of the university while seated on a toilet!

Participants were thrilled with their ability to be mobile while communicating. One mother of a disabled child, who had had to be near a wired phone in case her child's school called, was now able to leave her office and home. She said, "It changed my life."

As they carried their personal phones from place to place, participants formed a sense of their personal phones that was quite different from their sense of their wired telephones. At one point, we asked those who might not need these phones very much to contribute them to someone else; we got only four volunteers, and messages such as the following:

> ...I love my personal line phone. I think the trial should continue for another year.
> ...I need it ... you won't get a volunteer in me.
> I LOVE MY PHONE!!! Bell Atlantic will have to tie me down to get it back ...
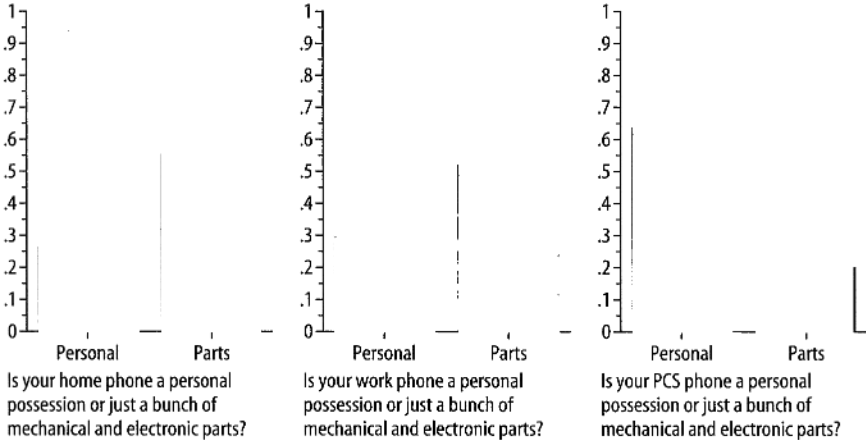> My phone has become a permanent part of my anatomy....
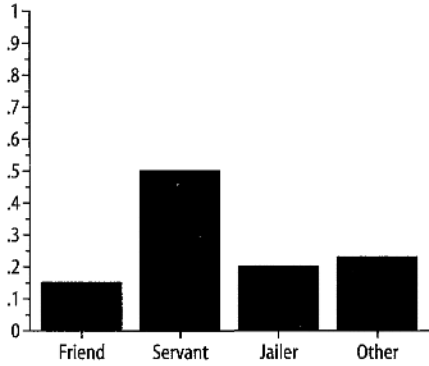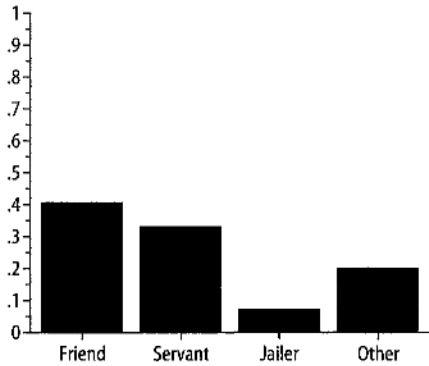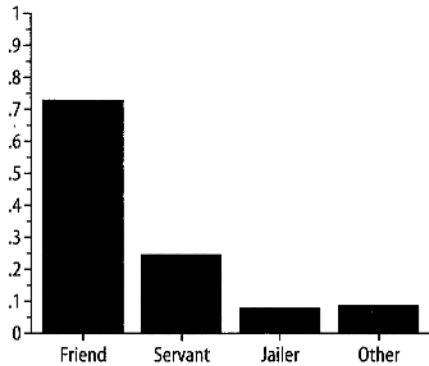

Figure 9.1 Personal possession or electronic parts questions

Is your relationship with your work phone more like that of a friend, a servant, a jailer, or something else?

Is your relationship with your home phone more like that of a friend, a servant, a jailer, or something else?

Is your relationship with your PCS phone more like that of a friend, a servant, a jailer, or something else?

Figure 9.2 Friend, servant or jailer

On our survey, we ask participants about their "relationships" with all their telephones. The stark results are shown in Figures 9.1 and 9.2. In brief, people thought of their little personal phone as a possession, an attitude that was very different from their attitudes about their wired telephones.
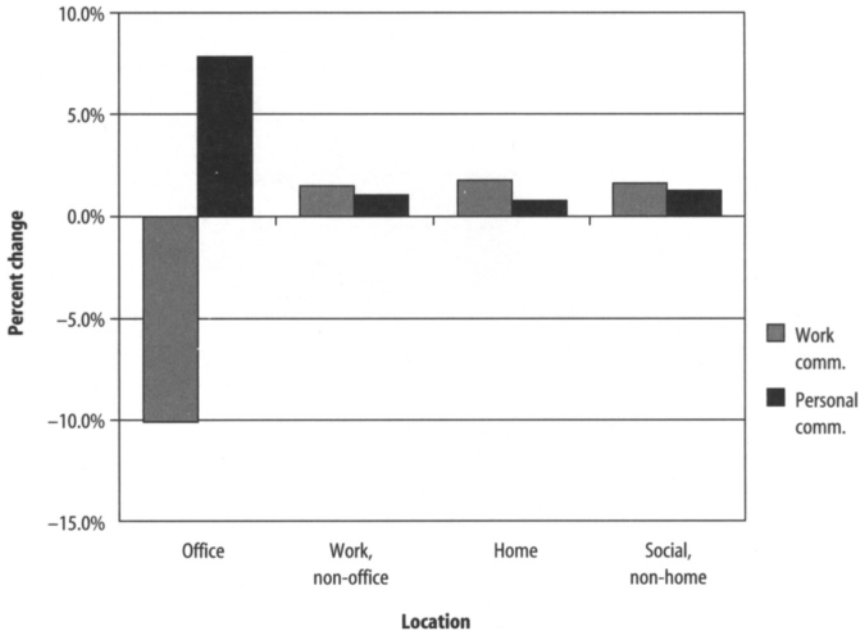
Figure 9.3 Change in location of communications received after cell phone introduction

With more mobility and a changed concept of what it meant to "have" a phone, the nature of participants' communications changed (see Figures 9.3 and 9.4). Participants initiated and received more personal communication in transitional work settings such as hallways and lobbies. Many said they were able to conduct personal business during otherwise "dead" communication time. For example, participants reported calling family while walking across campus – a work setting, but one where no prior phone access existed and where the personal call was not displacing ordinary work. We did not find that employees initiated substantially more personal communication from their internal offices, where the behavioural norms were very strong. Rather, the personal phones served to further weaken the salience of work norms in settings where the norms of communication were already weak.

On the other hand, participants did receive more personal communication in strong work settings. The "one-person, one-number" feature of the technology circumvented the strong social cue associated with the workplace phone number. For instance, the child of a trial participant called her mother at work on her personal phone and interrupted a meeting. The child did not normally call her mother at work for non-critical conversations, but since it was her mother's personal phone and not her work phone she though it was OK to do so.

This is not a one-sided story. Trial participants also initiated more work communication in non-work, personal and social settings. Unexpectedly, however, the main increase in work communication occurred not via the personal telephone, but face to face. That is, participants exploited their increased mobility to meet
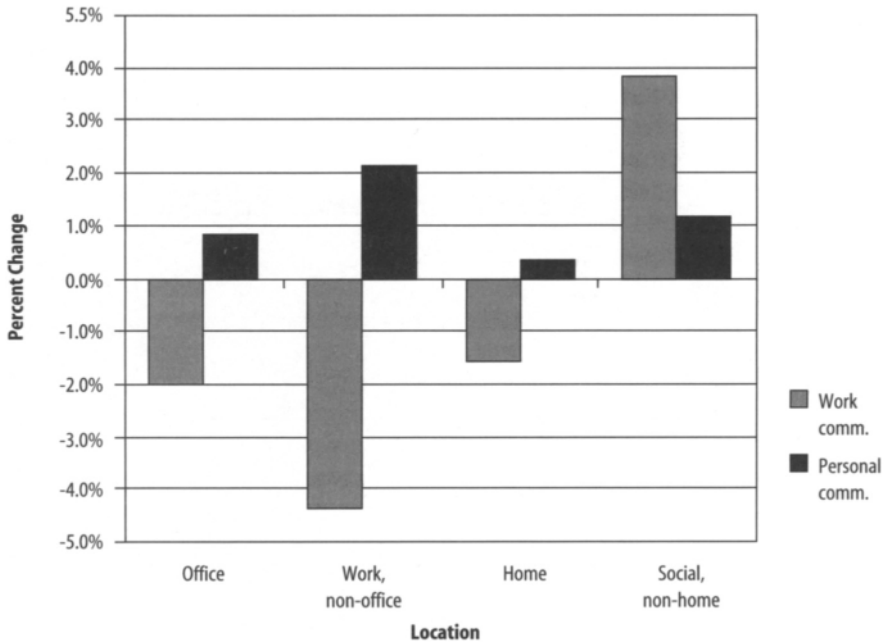
Figure 9.4 Change in location of communications sent after cell phone introduction

with co-workers in cafés, restaurants, parks, and homes to discuss work. The personal telephone gave them the ability to leave the office without worrying about missed phone calls. This was particularly true for employees in the Theatre Productions department. The personal telephones allowed them to shop for props together and still stay in touch with the office.

The "one-person, one-number" technology also made participants more susceptible to work-related phone calls at home. In one case, the supervisor of an employee in the Information Technology department called the employee in the evening with a technical, but non-emergency, question. The boss knew that the employee was off duty, but figured that he would call anyway. The boss had never called this employee at home using the employee's home telephone number.

To evaluate how these changes in communication might be related to temporal changes as well, we evaluated work communication during contractual work hours and non-work hours. To cover all the employees' work hours, we defined work hours as 8am–5pm excluding the noon lunch hour. Before the trial, 61% of all communications occurred during work hours. At the post-test, there was a small decline – 56% of all communications occurred during work hours. This result suggests more of participants' communications happened outside of work hours when they were using personal phones. We then re-estimated the regression logit models using only work hour communication to test the possibility that the increase in social communication in work settings might have happened due to people spending more time at the office during non-work hours. Results indicate that this was

not the case. In fact, social communications sent in work settings during work hours increased from 9% to 11%. Also, social communication received in work settings during work hours increased from 9% to 11%. These are not statistically significant changes, but do suggest that people tended to be less bound by the temporal cues of "work hours".

9.5 Conclusions

Many new information technologies intentionally change our work and lives. Wireless technologies were long intended to increase the efficiency of distributed and mobile business. Our research addresses some of the unintended social effects, and perhaps unexpected effects, of this technology. When we began our field trial of personal PCS phones, cellular telephony had not yet taken the USA by storm; our first surprise was how much our trial participants used these phones for both work and social purposes despite the considerable usability problems they faced. We learned that trial participants had become personally attached to their new phones and thought of them as personal possessions. Our results showed a clear shift in work and personal communication in behaviour settings. Our data showed that participants were sending and receiving personal calls in work settings and work calls in more social, personal settings. Telephone calls on the personal PCS phones, on the whole, were more spontaneous and unrelated to place and time than were calls made from wired telephones.

Many participants had mixed feelings about these changes in their own and others' behaviour. In interviews they said they wished they had buffers to prevent unwanted calls. Indeed, they avoided using the one-number option because they were wary of giving every potential caller the same telephone number. They were not as eager to be buffered by others, though. And only 2% of the participants used the call screening services offered. It is possible that participants' common behaviour of answering all their calls was associated with the novelty of the technology or with usability problems. Perhaps with more experience and design changes, participants' behaviour would have changed. Perhaps they would have blocked more social calls in work settings, for example, and left more calls for voice mail. Our data speaks only for the initial months of usage, not for long-term changes in behaviour. However, arguing against this possibility, we found that the IT professionals in the study showed an even greater blurring of boundaries of place than other participants did, and these were the very participants who experienced few usability problems and for whom cellular technology was less novel. And too, our observations of cellular use everywhere we go suggests that these phones are often used spontaneously without regard to time or place. The blurring of many old boundaries separating work, social life and personal life seems already widespread.

We believe a paradox of wireless technologies (cellular phones and other wireless devices) stems from their low cost and ease of use (in "plain-vanilla mode"), from their portability, and from their ability to work, untethered, regardless of place, time, and institutional or household infrastructure for communication. From our data, the interesting social effects of these affordances are:

- People are more mobile because they communicate anywhere and anytime. For instance, people do not need to remain in their office waiting for an important call.
- People more often use mixed-use settings to make the communications that were previously associated with strong social settings. For instance, work and personal calls are made in cars.
- Because mixed use settings do not have clear, legible cues, more work communications will take place even during "social" time or with family and friends in these settings, and personal communications will take place even during work time or with co-workers in these settings. For instance, people take work calls in a restaurant when eating with friends.
- Further, because wireless technologies are not tethered to specific places, callers often do not know the location of the recipient and cannot moderate their own behaviour according to the norms of behaviour settings. For instance, children call parents at work on the cellular phone.
- As people observe and use wireless technology across more settings and places, the social norms associated with the use of wireless technology in different places fail to become differentiated and clear. (Many organisations such as theatres and fancy restaurants make strict rules or install blocking technology to overcome this trend.) Indeed, the communication norms of even strong social settings begin to become less clear. For instance, some people who would not use their wired phones for this purpose take personal wireless calls in the office.
- To the extent that wireless that technologies are carried on the person, like wallets and purses are, they are considered personal possessions. So, norms governing personal possessions rather than behaviour settings begin to apply to wireless technology. That is, norms of personal discretion and politeness in interpersonal interaction begin to govern the use of wireless technology. For instance, people take personal calls while in a meeting but step out of the meeting to carry on their discussion.

The resulting paradox of these many changes is that, in the previous era, increased mobility led to an increasing separation of work and personal place and life. Wireless technology may be changing this equation. As we become more mobile, enabled by wireless technologies, we use the technology at our discretion. When an employee uses his personal cellular telephone to call his wife from the car on the way to a sales call, is he on work or social time? What if he is calling her from the lobby of his building, or from his office? Does an employer who provides the cellular telephone to his employees have the right to call them during evenings or weekends? Clearly, for the growing ranks of the technology-enabled workforce, wireless technologies make it difficult to draw a distinction between work and social life.

Acknowledgements

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