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Social Networks xxx (2005) xxx–xxx

SOCIAL NETWORKS

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Are social networks technologically embedded? How networks are changing today with changes in communication technology

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Abstract

Communication mediated by various technologies (from ordinary mail to today's Information and Communication Technologies (ICT)) provides important evidence for the study of social networks. Given that networks generate the possibility of interpersonal communication, data on technology use can provide important information on sociability. However, it is also true that personal networks not only shape, but also are shaped by technological means for communication, since these entail the re-constituting of social ties and the re-drawing of social boundaries. We use material from empirical studies carried out over the last 3 years to develop our hypothesis of the way forms of relationship change with technology. In particular, we try to understand the relationship between social networks (a set of social ties possessing one or more relational dimensions), exchanges between actors (made up of a succession of embodied gestures and language acts) and the various technical means for communication available today, which enable an exchange to be completed. Each of these three poles poses constraints on interaction, and provides resources for it, and thus all three shape the form relational practices take. Empirical data show how technological means of communication allow people to re-negotiate the constraints of individual time rhythms, and of who one communicates with. They also illustrate how the relational economy (and power) is affected by the deployment of communication technologies. Tools of communication provide new resources to negotiate individual timetables and social exchanges, making it possible to adjust roles, hierarchies and forms of power in relational economies. We argue that the general change observed over the last 20 years is from established roles to mutual reachability. The traditional communication model, where tele-communication is used to connect people who are physically separated from each other, is gradually being supplanted with a new pattern of "connected presence". In this new mode other people are telephoned, "SMSed", seen

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doi:10.1016/j.socnet.2004.11.001

and mailed in alternated way and small gestures or signs of attention are at least as important as the message content itself.
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Keywords: Information and communication technologies; Tele-communication; Presence–absence

1. Introduction

Since the seminal empirical work done in the 1970s (Berkowitz, 1982; Fischer, 1982a; Wellman, 1979), the structural analysis of social networks has proved a precious tool for sociological investigations of individual action and collective phenomena. Structural network analysis moved towards explaining social action as a form of network entrepreneurship in various social and historical contexts (Granovetter, 1974; Burt, 1992; Coleman, 1990; Padgett, 2001; Lazega, 1999). Meanwhile, the sociology of science and technology introduced Actor-Network Theory as a way to describe scientific innovation and unravel the apparent rooting of scientific objects in eternal truths (Callon, 1986; Latour, 1989), while "moral sociology" studied the justification regimes founded on networking as a particular form of striving towards a collective good (Boltanski and Chiapello, 1999).

However, social ties are often reified in structural analyses of social networks.[1] The naturalisation of ties acts as a foundation to the explanatory power of such approaches. Social behaviour becomes accountable from the objective and external perspective of the networked distribution of ties that is prior to the action. But two particular dimensions of social ties are often overlooked. First, the inner disposition to experience and sustain commitment towards another – what Simmel labels "faithfulness" – which stabilizes such commitments to social relationships, within an ever-changing stream of consciousness and beyond the initial context where such a relationship was born, like a kind of "inertial force of the soul" (Simmel, 1908). the actual work that is performed to accomplish relationships as observable sequences of reciprocal actions, as a temporally organized succession of moments of presence and absence, of encounters separated from one another by pauses and silences, bursting from a variety of events and situations, and relying on an ever-growing array of mediations and interactional resources (face-to-face, letters, phone calls, etc.) How is such a Simmelian inner sense and lived experience of enduring commitment related to the actual relational work performed by the participants to manage their interactions?[2] We try to address this issue empirically. For instance, does the constant growth (indeed, mass proliferation) of information and communication technologies (ICTs) lead to new ways of

[1] This is particularly clear in the graphical representations of social networks, and the hypotheses incorporated in the various programmes for producing graphs.

[2] We think that Vygotsky's concept of internalisation might help to grasp that particular issue. According to him, the activity of socialisation, relying on the decontextualizing power of material tools and language practices makes it possible to, produces stable higher level psychic forms and mental representations, through internalisation during socialisation. The point which is particularly interesting for our research perspective is that, such inner psychic functions will retain properties of the socialisation process and interactional mediations that governed their internalisation (Vygotsky, 1978; Wertsch, 1985).

managing close relationships, and to different experiences and representations of what a strong tie and one's attachment to it actually mean? The aim of this paper is to provide evidence that ICTs have had effects. So we argue that at the levels of the construction and experience of social ties, the nature and the role of the mediation technologies that are used to support them matter. In that sense, social ties and social networks are embedded in a web of interaction-supporting artefacts.

We will speak about "sociability", as the art of "living together",[3] which gathers all conventional modes of interaction with others, through which we manage to adjust our interpersonal behaviours, the temporal ordering of moments of presence and absence, the rhythms of speech, writing, gestures and silence. Sociability is made up from the flow of exchanges people maintain with those to whom they are tied. We see sociability as having *three* distinct poles: (i) social networks (sets of social ties with various possible metrics);[4] (ii) exchanges, that are performed through a succession of embodied gestures and language acts (these may take a number of different formats or *genres*, even within one medium—as has been shown by research on writing,[5] the telephone,[6] or on the forms of interactional reciprocity);[7] and (iii) the various technical means which are available at a given moment of historical time and which mediate actual interactions. Each of these poles poses constraints on interaction, and provides resources for it, and thus each shapes the various forms relational practices may take.[8] What is important for our approach is to go

[3] "Living together" in the sense of Barthes' (2002) analysis. Barthes distinguishes between, the metaphor of society as an ant-hill, and the alternative metaphor of society as a shoal of fish—a smooth symbiosis of individuals which are separate and equidistant, even though their respective movements are synchronized with each other movements.

[4] Critiques of structuralist network analysis (Gribaudi, 1999; Eve, 2002) have emphasized the tendency present in much formal network analysis to focus on one sphere – often work relations – neglecting the multiplex character of personal networks, which tend precisely to criss-cross several social spheres. Analyses which do have data on just one sphere are unable to focus on the tensions and contradictions which stem from playing in several spheres.

[5] For example, if we take correspondence in the nineteenth century and the particular case of letter-writing, we find a distinction between the formal, rather stilted register used to maintain relations with a range of kin, and the register of intimacy (Chartier, 1991).

[6] We have shown elsewhere (Licoppe and Smoreda, 2000) that systematic analysis of the length of telephone calls brings out variability in the formats of telephone interaction. We showed a continuum existed between "relational" and "interstitial" forms of telephone communication. "Relational" telephone calls are long and relatively infrequent, people taking their time to allow the conversation to develop, to give each other their news and share intimacy. "Interstitial" use of the telephone in contrast is made up of frequent short calls, for practical reasons such as coordinating activities, or simply to reassure someone of one's existence.

[7] Rather than the conventional distinction between written and oral communication, we are thinking here of the distinction recently introduced by Peters (1999) between *dialogue* and *dissemination*. Dialogue in this sense includes quite a wide range of interaction forms, not just face-to-face meetings and telephone conversations but also exchanges via e-mail or SMS if the exchanges are sufficiently close in time as to evoke the turn-taking of ordinary conversation. Dissemination on the other hand covers all those forms of communication where messages are cast into an interactional "vacuum", without having any certainty of obtaining replies. This is true for many oral messages left on answer-phones, for many written letters and e-mails or SMS when these written forms are not thoroughly embedded in a game of interactional reciprocity.

[8] It could be argued that each of the three poles involve a playful form of social life, drawing on the pleasures of (respectively) exchange, connectivity and presence. The first category (i) seems to us to be consonant with those theories which take networks as their explanatory principle – whether we are talking of the entrepreneurial actor exploiting social niches (Burt, 1992; Coleman, 1990; Lazega, 1999), the associationist innovator of Actor-Network

beyond generic concepts such as "interaction" or "interpersonal exchange", and distinguish (albeit only for analytical purposes) between the content and format of an exchange (for example the topics of talk and the way it is organized in discursive genres) and the different means of communication which mediate them and affect their production and meaning, within the framework of reciprocal relations.

This distinction is important for analyzing the role, which different kinds of communication media (e.g., telephone, email, instant messaging, etc.) play in interaction, and in the presumed transformation of sociability, which we want to pinpoint. The massive development of ICT has led to a significant increase in the range of interactional devices, which actors may use.[9] Alongside the standard telephone we have public and mobile phones – both of which nowadays may permit the sending of text as well as voice messages – and all the communication services which can be used through a computer, a PDA or a mobile phone connected to the Web (e-mail, chat sites, discussion forums, instant messaging services and so on). It is therefore important to examine this dimension where a growing number of the "technologies of encounters" (Thrift, 2004) come into play, for the sense of each of these different formats depends not only on their suitability for a particular kind of user and a particular type of exchange, but also on the position of each alternative vis-à-vis others in a technological landscape which has become increasingly crowded and varied. In a given situation, using a particularly mediated mode of interaction rather than another (e.g., sending an e-mail rather than calling a person) is extremely meaningful, and such conventional meaning is easily decoded by participants. A kind of ICT-based communicative rationality, based on conventional judgements and interpretive practices regarding the meaning of a particular mediated interaction, within the variety of differently mediated interaction that would serve a similar purpose, is thus constantly evolving. We illustrate this in part 2 where we discuss how a given action (announcing the birth of one's child), is performed differently when addressed to different nodes in one's social networks. We will show that the rationale behind the decision to tell a friend or relative about the birth on the mobile phone, rather than with a greeting card is based on assessments of the proper time that the news will take to reach a given person. Inner commitment to relationships therefore appears to be related to the temporal ordering of the mediated contacts, which actualize such a relationship. Contacts made via a particular channel of communication confer a kind of time-based tonus to the relationship. The choice of a particular technology rather than another therefore contributes to actors' inner experience of the strength of the bond.

We then move towards the crux of our argument and provide evidence for the existence of two distinct regimes for the temporal ordering of sociability practices. We will give particu-

Theory (Callon, 1986; Latour, 1989) or the schemers, game makers and networkers always able to put some project together and find the right people for it (Boltanski and Chiapello, 1999). In each of these lines of research we find the theme of the tie for the tie's sake, networking as pleasurable in itself. In (ii) we find that playful and gregarious (*geselligkeit*) form which Simmel identified, where the pleasure of the exchange derives from the possibility of abstracting the interaction from all the features which make it a particular interaction about something specific and with some particular person, for some definite aim. In (iii) finally the game consists in using the ever-expanding range of interactional media allowing one to keep in contact all the time, everywhere; here sociability consists in pure playing with mediated presence (a mode we will discuss further in the last section of this article).

[9] Note that formats in which interaction took place were already complex before the advent of information technology, as research on different forms and registers of writing has shown (see, Albert, 1993; Frenkel, 1995).

lar attention to the ways communication technologies (the tools used to achieve sociability) allow people to be present or absent. The first of our two regimes relies on an opposition between absence and co-presence, which is rather widespread in the Western world. This idea is the foundation for the representation that ICTs can be considered as surrogates for co-presence, in circumstances where face-to-face meetings are too difficult to organize. The uses of the letter or the telephone have often been described in terms of this kind of representation. What therefore characterizes this model is the ambiguous role attributed to the technologies of communication. The latter give people the possibility to stay in contact even though they are separated physically. However, real, physical meeting is considered as the ideal and full figure of interaction. The mediated interaction can only be an imperfect, unsatisfactory compensation for the lack of co-presence. We discuss the pervasiveness of such ideas, and try to show how they acts as a cornerstone for a kind of relational economy working within the entrails of sociability. Concentrating on the analysis of strong ties between family and friends, we will show how this relational economy produces observable quantitative regularities in communication before and after biographical events like birth of a child, which subsequently change the form of the personal network. These regularities do not lead to principles, which would determine relational practices (as the invisible hand does for economic transactions), but to ways of organizing the work of sociability which can be accounted for, and which are meaningful to participants.

We will provide evidence for the emergence and reinforcement of a new sociability pattern, in which presence is not simply the opposite of absence. In this new pattern technologies of communication (in particular mobile phones) are not just substitutes for face-to-face interaction, but constitute a new resource for constructing a kind of connected presence even when people are physically distant. In the regime of "connected" presence, participants multiply encounters and contacts using every kind of mediation and artifacts available to them: relationships thus become seamless webs of quasi-continuous exchanges. The boundaries between absence and presence get blurred and subtle experiences of togetherness may develop. The use of messaging technologies develops, for "connected presence" weighs heavily on participants' limited availability and attention; however committed they are to sustain that form of mediated sociability. Phatic communications becomes increasingly important, because simply keeping in touch may be more important than what is said when one actually gets in touch. In a sense, any type of mediated contact does the job of sustaining social bonds in the regime of "connected presence". ICTs then need not be seen as a surrogate for the face to face: physical encounters, letters, phone calls, e-mails and SMS may share the same positive value of bridging seemingly unbearable experiences of absence and silence, however fleeting those might appear to be.

We draw on a number of studies carried out recently in France. A first set contain databases of telephone traffic, plus interviews focusing on the use of the telephone. So they provide us with quantitative and qualitative material on ego-centered personal networks of telephone/electronic sociability,[10] in addition to qualitative information on interpersonal

[10] Telephone sociability is defined here as that specific part of social life which passes through this particular medium. We aim to show that it is incorrect to slide into talking of telephone sociability as though it was simply sociability which happens to make use of the telephone, for it adheres to different rules from sociability in general, as we have defined this above.

exchanges taking place through other media. The studies in question cover the way the practices of social life change with biographical events such as a move (Mercier et al., 2002) or the birth of a first child (Manceron et al., 2002). In spite of being thoroughly normal, these biographical events are major tests in the construction of self. They constitute particularly interesting areas to examine our hypotheses regarding the connections between the more or less shared, public representations, which organize coherence and the concrete involvement of actors in relational practices. They provide an empirical opportunity to observe sociability at work in its triple inscription in social networks, forms of exchange and uses of communication technologies.

We also draw on a second group of studies, which investigate interpersonal exchange via screens—forms of "always connected" sociability. These studies provide quantitative[11] and qualitative data on uses of the Internet, e.g., the way people use spaces of interpersonal communication (Beaudouin and Velkovska, 1999), and consumption and gifts (Licoppe et al., 2002). We will also use the results of research carried out on the exchange of messages via mobile phones (Rivière, 2002; Rivière and Licoppe, 2003).

2. ICT uses and the production and reproduction of social networks

The interaction is guided by conventions but also constructed in the course of interaction itself. The temporal rhythm of exchanges and the degree of attention expected from one's interlocutor differ from one medium to another, according to whether we are discussing telephone conversations, e.g., e-mail, chats, SMS, letters, announcements of birth, marriage or death, etc. Actions and reciprocal actions can take place on the model of a dialogue, where exchanges evoke responses almost immediately, or alternatively may leave much longer intervening pauses—intervals, which may or may not be acceptable. In certain cases the action initiating the cycle has a conventional format. For example, biographical events like marriage, moving house or the birth of a child produce the almost ritual format of the "announcement".[12] Since these exchanges have a generic character they can take place on different media without changing form, and often without involving extra effort. So the choice of one medium rather than another has a social sense: the decision to use a particular way of announcing the event is a way of reaffirming and reshaping closeness and distance in the personal network. In general, the closer the relation, the more important it will be to make the announcement rapidly and to obtain a reply. In the same way, the use of a particular medium for communicating the news is taken as a statement of distance or closeness, depending on the delay a particular technical medium allows in replying. This particular type of interaction shows how the choice of one medium rather than another produces and reproduces the social structure. It shows that when analyzing sociability we do indeed need to pay attention to the technical means used to communicate.

[11] We have developed a platform for the statistical analysis of text suitable for the analysis of internet and "access logs" (Beaudouin et al., 2002). In combination with interviews with users, this data allows us to explore the various combinations of interpersonal exchange practices on the Web.

[12] On marriages, see Maillochon (2002).

We can thus observe that the announcement of the birth of a first child takes place in a series of concentric circles, starting with members of the immediate family and closest friends, followed by "less close" friends and more distant family, with mere "acquaintances", "cousins", "colleagues", etc. coming last. According to whether the news comes direct from the parents or via an intermediary, whether it comes directly after the birth or with a certain delay, via face-to-face contact, telephone, e-mail or letter, a hierarchy of relations emerges: "*We told our parents and grand-parents first; it was Pierre who told them. And it was them who passed on the news to the uncles and aunts and cousins . . . So they heard at 2.30 a.m. (. . .) Then the following day we phoned our closest friends, and they passed the word on to friends who aren't quite as close. I mean, a bit less close or who we hadn't spoken to on the phone for a while . . .*" (Woman, 28, Paris, couple with one child). The first people chosen to hear the news thus hear it without any intermediary as sign of the quality of the relationship.

The calls made immediately from the clinic and in the following days by the people who act as relays for the news are complemented by other means of communication – written announcements and e-mail messages – which make up a second level of prioritization. Once again there is a correspondence between the means used and the content of the relationship. Friends who are seen less frequently receive a written announcement of the event; colleagues are more likely to receive an e-mail.[13] These written media are less committing in terms of reciprocity compared to conversation (face-to-face or on the phone).

There is more delay before these messages are sent, and a further delay is expected before a reply comes. The length of this latter delay can be read as a sign of the degree of involvement of those receiving the message, a measure of how close they feel to the new parents. Those friends who do not reply, or reply only after a long delay, risk to be abandoned, whereas certain others who reply more quickly than expected may be readmitted to the circle of intimates.

The differential use of particular means of communication thus lays down a space of relational practices where ties of similar closeness are treated in a similar way, and where this degree of closeness is publicly expressed and negotiated. Relational proximity is shown to be greater if the news comes via telephone immediately (rather than with a delay) and directly (without the mediation of another person), and depending on whether it comes in the form of a written announcement (which may or may not be followed by a telephone contact), and according to whether it comes via mail specially addressed to one individual or to a whole list of people (see Fig. 1).[14]

The question of time is ever-present. The event of a birth constitutes a "testing" of the network of social relations in the sense that it is an occasion in which the relational distance between the couple and their various ties is redefined. The delay between the event and the announcement of the event is, as it were, a statement of the tempo of the relationship,

[13] Manceron et al. (2002, p.98).

[14] "That does make it possible to keep in touch. I noticed that when, after the birth, we sent an e-mail to more or less all the people we knew, all the ones who had an e-mail address, saying he's born, he's super, and all that. I even sent the message to old addresses I didn't know were still valid or not, people I hadn't been in touch with for 2 or 3 years. And some of those people replied, so we made contact again – whereas I would never have called or written otherwise".

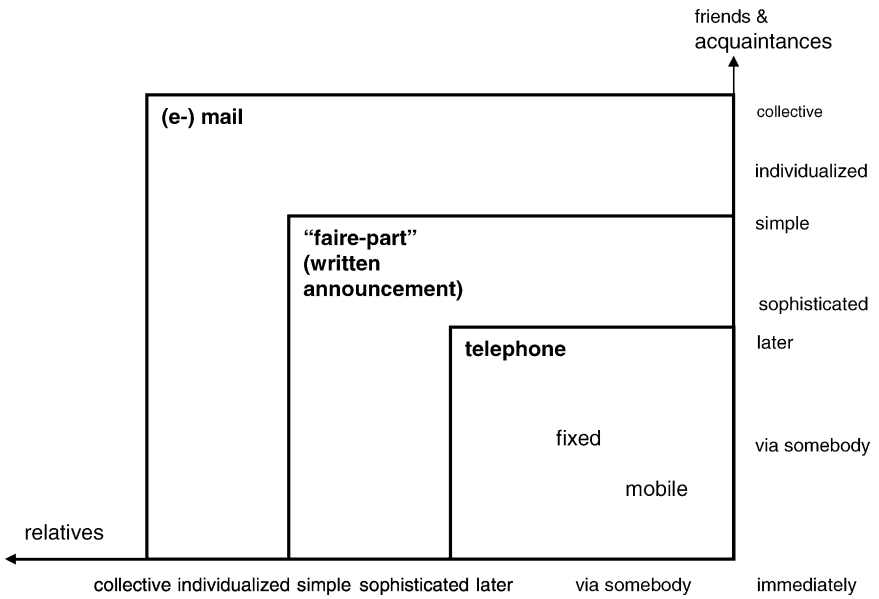

Fig. 1. Media and timing of announcements of birth of a child, by relational proximity of the correspondent (adapted from Manceron and Leclerc, 2001).

and thus of relational proximity. The status of relations within the personal network is thus renegotiated via a temporal metric, a timing, which depends on both when the news is given, and on when the reply comes. The role of different interactional media in sociability is also reaffirmed and redefined in the course of this test, which employs them to perform the same language act, but to different persons. Telephone contact comes out as having the highest status, being most appropriate for giving the news to the closest circle of family and friends, those one prefers to see or hear from in the immediate context of the event.

The work of sociability thus turns into a joint redefinition of relational proximities in the network, and a redefinition of the sense of each of the interactional resources available for the maintenance of the relationship. This redefinition makes use of an ordinary event and a standardized interactional format—the announcement. The biographical event is thus the occasion for a test, which concerns the most appropriate modalities of adjusting the interactional dynamics.[15]

Similar patterns can be seen in the various festivities of the year and in the present giving these involve, for timing is crucial here too. A mother interviewed in one of our studies, who is a great user of internet, says she would not consider ordering her son's Christmas present on the web, fearing that the delay in delivery might make the present arrive late, whereas

[15] Of course the birth of a child is not the only test of this kind. Other biographical events such as a move or marriage pose similar problems (cf. Mercier et al., 2002, op. cit., Maillochon, op cit.), and in general, as Douglas (1991) has observed, there are many ordinary events that can serve as the basis for a social distance redefinition. The specific events discussed here, by their intensity and more codified character, help us to grasp the role played by communication technologies in relationship confirmation or redefinition.

her role as mother means that the present must be there on the day. Things are different, in contrast, with regard to the neighbor's children: "*On the other hand, for the neighbors' kids I normally order them through Alapage some comics . . . if they don't arrive, well they'll have to wait till the 26th. I'll tell them, 'Look . . .' They'll have their presents from their parents. It's not the same thing for your own child. If I saw my Paul putting out his stocking and all the others had their presents, but not him, you can imagine his face . . .*" (woman, 39, couple with three children). Events and ritual festivities thus work also as tests of a relationship. They are an occasion for reaffirming the strength of a relationship or on the contrary for endorsing its inevitable decline. It is the use one makes of the different temporal arrangements implicit in various technical means of communication, which expresses this hierarchy.

But a tie is woven out of many contexts, many occasions and many technical means of communication. It is constructed in a constant point and counterpoint of interaction, a chronicle of encounters – each with a particular form of communication – where the thread of timing stitches presence and absence according to the characteristic modes, which make up a relationship. To conceptualize the three-cornered dynamic between the tie, the forms of the exchange, and the technical means used, requires an analytic framework which takes account of how a tie is "tied", how interactions via various media are ordered in time, and interspersed with periods of silence or inattentiveness.

3. Intermittent presence and ICTs as limited surrogates to face to face encounters

Actors' use of the telephone and of written communication is organized in a variety of modes. The first of these describes that modality which we have called "relational". In the exchanges, which take place between close friends (or intimate relatives), long conversations and the exchange of long written texts mark out an interactional space, which overcomes absence. The people in question give and receive news, reconstructing a shared world because they have not been able to see each other or talk for some time. The telephone call, the letter or e-mail signal an intention and show that, notwithstanding the absence, *alter* is present in *ego*'s thoughts. Gestures, gifts, written messages and conversations thus help to maintain a tie, which is rendered fragile by too much separation. Without pretending to be substitutes for face-to-face contact, these means try to compensate for the rarity of such contact.

This mode of technically mediated sociability is not new. Throughout the centuries it has adapted to the transformation of interpersonal mediations. In the sixteenth century the exchange of gifts between peers, gentlemen and scholars helped the latter to keep in contact "*like the stones of a good building held together by cement*" (cited in Zemon Davis, 2003, p. 105). In the nineteenth century, bourgeois correspondence took up the same theme. We might even talk of an epistolary pact—a widely accepted idea that physical separation is a test for the letter-writers to overcome. Letters thus filled in the absence of the other by providing news and signals of presence. Another theme which is common in the nineteenth century is that of letters as substituting conversation or chat—that chat which physical separation has made impossible (Dauphin et al., 1995). In defining letters as a "conversation between absent friends", contemporary manuals of writing even presented

this kind of attitude prescriptively as the correct one (Dauphin, 2000). Nowadays, it tends to be the telephone, which is seen as the most appropriate tool for maintaining an intimate tie: "*You use the means of your own times. I think we would have written to each other if the telephone didn't exist. We would have kept in touch. You use whatever means is most handy . . . the easiest thing is the telephone*." (Woman, 35, Toulouse, couple with no children).

Research on networks of interpersonal relationships and in particular on friendship (Bell, 1981; Bidart, 1997; Fischer, 1982b) maps the direction in which patterns tend to change over the life course. For young people friendship tends to be tied to shared places and group activities. Opportunities to see each other are frequent. Exchanges mediated by technical means nonetheless constitute an important connective tissue coordinating and synchronizing group activities and meetings. The fact of being "on the list" both expresses the fact that one belongs to the group and makes it possible to participate in group activities (Manceron, 1997). Albeit this prevalence of the group, a few friendships do detach themselves from the collective context and are cultivated with their own rhythms. So secondary school students use the possibilities provided by mobile phones, chats or instant messaging to communicate after school with members of their groups—thus interacting in a more elective, individually focused form of sociability, freed from the tyranny of keeping up appearances which often dominates adolescent groups.[16] As the years go by, activities diverge and friends move geographically, and these changes create a tendency to extract a few privileged ties out of the original mass of collective links, and these dyadic ties are maintained for their own sake. These lasting friendships are thus immediately subjected to the test of biographical events.[17] When such events seem to place a "distance" between friends the use of mediated forms of communication like the telephone can be crucial—and the "relational" modality of interpersonal exchange seems particularly suitable for this purpose.

The telephone, and in particular the "relational" mode of telephone usage is therefore a particularly appropriate tool helping people keep in touch with each other and find a new equilibrium between periods of absence and moments of presence, fitting the cadences of everyday life with the rhythms appropriate for intimacy, and thus re-negotiating the "right" distance for the tie. "*Well, given the enormous mass of work I have to do, I don't have much free time to spend. As I say, it's hardest at weekend because everyone tries to work a bit. So you don't see each other, you see fewer people and I miss that, and yes, I spend a lot more time on the phone. And it doesn't always work; it's frustrating, I find being a long way away hard to cope with at the weekend*" (man, 20, Toulouse, single). As we already have pointed out, this relational significance has its effects on the form which telephone calls take: these become less frequent but longer ("*You maybe make fewer calls to friends, but calls which last longer*"—man, 30, Paris, couple with two children) as people seek to re-establish via words shared experience in spite of the distance which separates them.[18] "*When you move, you're in a whole new context, a new life . . . that takes more communication, to explain*

[16] Pasquier (2004).
[17] cf. Bidart and Pellissier (2002).
[18] Elsewhere (Licoppe and Smoreda, 2000), we have confirmed statistically using a logistic regression that geographical distance significantly increases the length of telephone conversations independently of gender and age of the people concerned. The association holds, whatever type of relationship (kinship, friendship, etc.) links the two people, and whatever time of day the call takes place at.

it all . . . yes, that's what happens, that's what happens, you have more to tell people; so when you move – at least, this is what happened with us – at least during the transition period, there's an increase in your calls and your communication." (Man, 40, Toulouse, couple with two children).

It is interesting to note that this effect does not only affect telephone interaction. All kinds of interaction take on a different relational mode when a biographical event such as a move tests the relationship. Thus face-to-face meetings also become more charged with expectations and take on a new form, becoming longer and rarer, more out-of-the-ordinary than they were once. "*It's much more intense. Now for example we'll be seeing each other the whole weekend. They're arriving tomorrow, and they'll be going on Sunday evening. Whereas before, well, we used to see each other for a meal, or we might spend a bit of the afternoon together, then we'd both go back home, or at least in the evening. Whereas now you really take advantage of the time you have, you go for walks, we're planning a picnic on Sunday . . . you do things you wouldn't have done otherwise, it's funny isn't it? But maybe we wouldn't have done things like that when we were living close . . . we used to live 10 kilometers from each other. Or rather, the closest lived just 10 km. Away, the others, well anyway it was 'Hey why don't you drop by, come and have a coffee', then 'Oh well, I'll be getting home, I've got to put the children to bed'. Whereas now there's no putting the children to bed here! So it's . . . it's more concentrated . . . it's . . . it's better*." (Woman, 40, Montpellier, couple with two children). In becoming more of an "event", more "concentrated", face-to-face meetings of this kind demonstrate the commitment of participants to the tie and inscribe the relationship more firmly in memory.

There is therefore interdependency between the tie, the distance and the form taken by interaction. This leads to empirical regularities, face-to-face meetings and telephone calls become rarer and longer when the physical distance between correspondents increases. This is a very robust effect in our research results, as can be seen in Fig. 2a and b, which gives data on length of calls and number of calls by geographical distance separating the speakers before and after a move of one of the households. It can be seen clearly that the length of telephone conversations increases with geographical distance and with the infrequency of calls.

Thus interpersonal sociability here takes the form of a compensatory economy, malleable enough to account for the variety of sociability practices (and lacking any form of decontextualized standards to assess them),[19] but rigid enough to produce regularities that can be documented. In their attempts to maintain a tie, which is classed (retrospectively) as a strong and lasting relationship, actors reallocate scarce resources like time, personal availability and physical effort to find an adjustment between absence and moments of interaction and sharing which appropriately expresses the status of the tie. In other words, an equilibrium which is appropriate for a "living-together" as friends in the new context created by the geographical move.

This relational economy is embedded in the economy in the classic sense of the word. For money constitutes one of these rare resources, which have to be allocated in the household,

[19] In this it differs from classical economy, where the behaviours of actors are "performed" by mathematicisable theory which relate forms of exchange to each other via price, that just equilibrium price which defines the optimum for a market transaction (Callon, 1998).

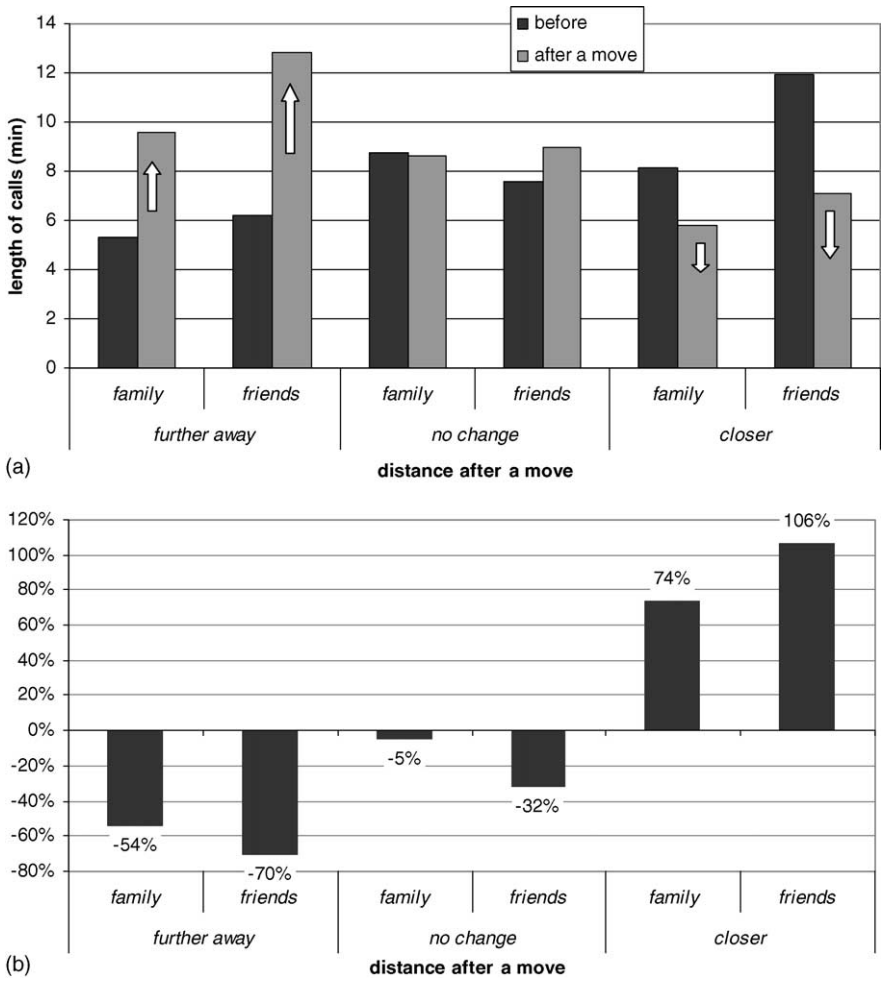

Fig. 2. (a) Average length of telephone calls (in min) by change in the geographical distance separating the speakers (family and friends). Source: Mercier et al. (2002), p. 140. (b) Change in the frequency of telephone calls by change in geographical distance separating the speakers (family and friends). Source: Mercier et al. (2002, p. 141). Key: "Further away" means that people who, before a move, lived near each other (less than 50 km) now live further away. "Closer" means that people who previously lived further away now – after their move – live within 50 km of the friends/relatives in question. "No change" refers to ties where the friends/relatives were more than 50 km away both before and after the move. The data regard the telephone traffic of 110 households who moved home, recorded for 16 months (4 months before the move, 12 months after it).

thus necessitating negotiation over what is the collective welfare. The question is not merely a question of accounting in the simple sense – the total of costs of interaction with friends and relatives, which appear at the end of the month in the form of bills – but also a question of adjusting different temporal rhythms. For example, to encourage customers to spread out calls, telephone companies usually charge different rates for different times of the day.

Financial pressure is thus felt as a cadence imposed without regard to consideration of the needs of a relationship; following a move one is obliged to conform to this external cadence in relations with friends and family: "*well, every so often you really feel you need to make a call, but I hold myself back a great deal, even for calls to my family, because I think what you pay is too much (. . .) So I think that the phone is a bit scandalously expensive, and it's not so easy to take advantage of the times when the rates are cheaper. I don't really take account of those, I don't manage to work it out. Anyway often it's not easy when you want to catch people when they're still up. You know, there are the children, meals and so on and, well, after all that it's getting a bit late so you ask yourself if you can call so late. And in any case when it's late you don't necessarily have the energy to make that warm, emotional call you would have made during the day . . . So, that's the telephone, how we use the telephone. It's not something I talk about often, but it twists me up inside when I think of the bills I pay, and I feel I'm being taken advantage of* " (man, 40, Toulouse, couple with two children). In this case the dissonance is expressed by the fact that this interviewee uses the language of social injustice; he sees his right to maintain ties with family and friends as bumping up against the constraints of economic rationality.

The actor of this kind of economic rationality is a "strategic" actor who manages their resources in such a way as to maintain strong ties and make sure they come through the tests imposed by biographical events. Successful optimization sometimes makes people feel retrospectively that such life events constituted no threat to the relationship: "*they come to see me, I telephone them, moving hasn't turned my life upside down at all, it's hardly changed anything in my relationships with the people I'm really close to*" (woman, 26, Paris, single). Others take a different line: "*It's true that there are times when we won't telephone or write. But I think we've got a really deep friendship, deep feeling, we really respect each other, value each other as individuals, so that's what it's all about – it's not that you think 'Oh dear, I ought to keep up the relationship' "* (man, 40, Toulouse, couple with two children). In this case the friend is represented as being so strongly present in the memory that there is no need for any strategy to preserve the tie. Due to this continual presence of the friend *in absentia* in his thoughts, *ego* can delegate the task of maintaining the tie to whatever contacts happen to come along, none of them explicitly aimed at maintaining the tie. The right distance is found via interactions, which due to the faith one has that each is thinking of the other, have no problem in finding an appropriate rhythm, which makes up for the physical separation.

This "relational" mode is only one of those, which exist in the landscape of sociability *via* technical means. There are other patterns of "living-together", alongside the mode where long conversations compensate for the days people cannot meet up, we can discern a kind of "interstitial" communication where there is a proliferation of exchanges and messages regarding the coordination of activities. These act as connecting tissue, and form a suitable terrain for a particular form of mediated sociability—"always connected" presence.

4. "Connected" presence as another form of mediated sociability

This "interstitial" communication consisting mainly of short calls and messages exemplifies another pattern of presence and absence—a pattern where absence no longer means

silence. Actors who are close socially (and often also geographically) are in this pattern frequently in contact. With these close people whom are seen nearly every day there is the closest intertwining between situations of co-presence and a connecting tissue of messages sent by phone, etc. This pattern is without doubt currently most widespread among young people whose social life and diversified use of communication resources constitute a suitable terrain for this kind of uses. But in all cases shared activities, requiring numerous calls for coordination and synchronization, form the backdrop for this mode of communication.[20] The calls are so frequent that they act as reminders of the other's presence. It is less necessary in this mode that the messages should manifest commitment to a strong tie: the reciprocal commitment is visible in the very frequency of the calls and messages which coordination of shared activities make necessary. In this pattern, therefore, the strength of the tie is seen rather than said. This interstitial pattern makes heavy use of technological means of communication. It has developed considerably in recent years with the emergence of portable means of communication, which are especially suitable for coordination.

It has also been encouraged by the development of various kinds of message systems such as answering services, e-mail, SMS, etc. These technologies for sending messages loosen the constraints, which would otherwise be imposed by the proliferation of communication because they allow the person receiving a message to choose the moment of reply. For the more numerous communications become, the more frequently people have to interrupt the activity they are currently engaged in to fit in with another cadence. The risk is that ties with friends will become institutionalized in the form of expectations and mutual obligations to be constantly available electronically. Mediated sociability currently seems to be countering this risk of control and preserving playful pleasure and improvisation in the interpersonal tie by making greater use of less intrusive means of communication. Thus in the last 10 years there has been rapid growth of telephone and electronic contacts, but an even more rapid growth of message systems.

This development has been accompanied by more subtle changes, which crystallize a real new way of "living-together", where the distinction between co-existence and co-presence becomes thoroughly blurred. Calls and messages become so frequent and their formats so varied that, together with face-to-face meetings, they make up a tightly knit and seamless tissue of interaction—a real "always connected" presence (Licoppe, 2002). Expectations may be quite high, and any breach in this fabric of mediated contacts can be interpreted as a loosening of the ties. A girl of 20 describes how she feels when she does not see any messages: "*When I do not see "You have mail", I say to myself, "oh no!" . . . It hurts, they are not thinking about me; I look at my messages, I have thought about them, but they didn't send any messages. So one is disappointed, that is true.*" Empty mailboxes seem to contradict the idea that there is an inner sense of commitment. The continuity of close relationships within one's head must be matched – thought for mail and mail for thought – by the continuity of the flow of messages on one's messaging systems.

[20] This was first observed in ICT studies as a systematic difference in call frequency in large metropolitan areas and in small towns and villages (frequency being much higher in cities). This gap between town and country has decreased with the spread of mobile phones and the patterns of communication that such devices make more salient.

At the same time short calls and messages fulfill a phatic function where the discursive content of the communication gesture is less important than the act itself.[21] Phatic communication is spreading, for it constitutes a key resource in the management of quasi-continuously connected relationships. Rather than constructing shared experience by recounting small and large events of the day or the week, one sends short expressive messages, giving one's sensations or reactions to some event, an emotion, or perhaps asking the person to express themselves in this way. While the exchange of letters in the nineteenth century required people to justify themselves if they had nothing to say, and to fill the page with "I love you" or "you are in my thoughts", such condensed expressions of intimate emotion become a positive resource in "connected" living-together. In the semiotic of the discourse of love, "I'm thinking of you" condenses presence and absence in the same language act, to the extent that it reveals both forgetting of the other and waking up from this forgetfulness (Barthes, 1974). But it is the repetition of these little messages, which maintain the tie, filling in absence via a sort of incantation. The rhythm of the connected tie consists to a considerable extent of this insistent psalmody of short expressive messages. In the framework of ties between close friends, they will tend to be as frequent as possible, for the more this presence-at-a-distance is continual, the more it is reassuring in terms of the tie itself. If the "always connected" presence is most prominent in intimate ties, it is not found only where people live close to each other, or see each other frequently. The availability of new technical means may stimulate this pattern in the attempt to find a solution to the problem of living-together. This is illustrated by a young woman (in her 30 s, married with one child, living in the provinces) whose best friend is in Britain. They had few exchanges until recently, and only on the initiative of the friend, for phoning abroad is expensive, especially for long "conversational" calls, as is usual between best friends. "*Before I had internet it was usually her who called me, I didn't call because financially it's very expensive, so I didn't call. And I'm very lazy about writing letters – writing the letter, getting the paper, then going and posting it and all that, I hardly ever do it. Whereas an e-mail is different: I connect up, I write her a little note and that's that*." To write a letter required too much organizational and cognitive investment. With e-mail the financial cost is no longer a problem (unlike the telephone) and the effort necessary to initiate an exchange is minimal (unlike a letter). This makes it possible to have frequent small exchanges. These two friends have effectively turned to a "connected" mode of managing their relationship via their use of e-mail. "*And I discovered how pleasurable it was to write to her, because we replied to each other. It wasn't chatting directly but we corresponded, she received my mail, she replied immediately and sent off the reply, and sometimes I would reply back. Sometimes it was just one sentence that we'd send off like that*".

It can also be seen in these examples how "connected" presence, in its emotional and expressive register especially, exploits non-dialogic means of communication (voice messages, electronic message systems, SMS), which signal a demand for attention but allow a deferred response. Sometimes indeed these messages do not even require a direct response, for they authorize a kind of civil lack of attention. In some extreme cases the mere fact of knowing that a line of communication is active and that one is therefore

[21] In this sense we could term this an almost "phatic" maintenance of ties (Jakobson, 1973).

"connected" to the other is sufficient.[22] The emotion, which accompanies this knowledge makes the tie present to consciousness and for the moment make exchanges of words superfluous. In the same way this mode of mediated sociability provides revealing evidence of the violence inherent in face-to-face or telephone conversation. One needs time, the time of absence, to manage and digest this violence of dialogue—a kind of time which is not very much in evidence in this mode where there is such stress on "connected" presence.

E-mail or short messages sent by the mobile phone thus constitute an especially suitable resource for managing relational difficulties and making bearable expressions of aggressiveness in a relationship. "*Short messages make it possible to step back a moment. Even when the person sends a very aggressive little message there is always the telephone between you. It is less violent I would say. You lose your temper less I think and you don't remember it so much as you do with verbal aggressiveness*". Messages of this type are much used in the management of love relationships. The following man, in love with a dancer whose hours of work are very different from his (he works in the daytime, she at night), short messages are part of a strategy intended to reassure the other of a loving presence without seeming to solicit a response too embarrassingly. "*Yes, I have sometimes thrown out . . . for example . . . a phrase like, for example 'I miss you' – I know that if I say that on the phone there will be a pause afterwards. Not because she doesn't want to reply but because she takes the sentence for herself and turns it over. So I put it in an SMS. That way at least I'm sure there won't be a pause afterwards and I won't have to start the conversation up again. It's just a phrase and that's it*". Messages of this kind thus make it possible to negotiate very close relationships, helping to negotiate a difficult passage without breaking the thread of mediated contact or the "connected" tie. "*That happened with my best friend. We weren't getting on for two or three months and the only thing we did was to send each other SMS, but really horrific ones. I can't even begin to describe them. He called me up two weeks ago and said 'Look, I was half joking in all those SMS. I love teasing you and all that because I know you get mad at once . . .' Well, if that had been on the telephone it just wouldn't have been possible to backtrack like that. You see, it's not the same . . . We let it go as if he had just been taking the piss out of me, whereas if it had been on the phone he couldn't have piss me about like that*".

There is a fantasy of living-together, which conditions uses of the various technical means of communication. As we have seen, what attracts in the ideal-type of "connected" presence is the opportunity to reshape a piece of one's interpersonal sociability, where presence is always mediated and increasing use is made of non-intrusive message systems. These thus minimize the risk, which is inherent in any interaction.[23] The right distance in this new configuration is thus a matter of finding a suitable balance between forms of interaction, which minimize interpersonal risks and forms where actors commit themselves enough to be vulnerable and to mobilize all their attention. So instead of the play between absence

[22] This is true especially in the case of instant messaging systems. Between a group of "buddies" where an icon appears when someone connects, thus making their connection visible.

[23] Some philosophers (e.g. Dreyfus, 2001) have argued that intrinsic limits exist to the extent that electronic media, and in particular the Internet, are able to create strong ties. The less interactions are embodied, and the less risk there is for participants, the less these participants will reveal of themselves.

and co-presence, we would have a play between lack of attention and absorption, between safety and interactional vulnerability.

5. Conclusion

Social ties are the basic units of social networks. We have shown how the relational work, on which strong ties are built is shaped by the tools of communication used in such work. We have distinguished two modes in the management of contacts - intermittent presence and connected presence. The two cornerstones of our analysis have been the way interactions and contacts are distributed over the variety of communication artefacts available in the current technoscape (which allowed us to argue that social networks are embedded in this communication technoscape), and the temporal sequential ordering of such interactions and contacts. Such analyses explore a relatively neglected scale in the socialisation process, in between the large-scale perspective of social networks and the small-scale perspective of the micro-sociological construction of interactions. A fuller research program may be envisioned, for the development of digital communication technologies provide social scientists today with new resources, providing them with large scale databases (several thousands of participants) of mediated contacts (gathering such data as the nature of the persons involved, the time of day contacts occur, the call duration or messages volume, sometime its exact content, etc.), over extended periods of time (months and even years). Such data can be supplemented by logbooks (which cover shorter periods but are able to document all kind of interactions, including face to face and handwritten exchanges) to allow full-blown quantitative studies of the dynamics of sociability.

Some research questions then gain a new form of prominence. For instance the status and meaning of presence and absence become salient issues, equally relevant to the quantitative approach and to fine-grained qualitative studies. Anthropologists have shown how moments of silence and absence are usually treated by participants as trials of their mutual commitment to an ongoing relationship. Moreover, silence and absence are always ambiguous, and any attempt at classification or justification must take into account that cognitive, pragmatic and moral ambiguity (Tannen and Saville-Troike, 1985). Silence and absence can always elicit positive interpretations: so even though alter may keep silent or keep away, this is seen as being because s/he is absorbed in their own actions (the relationship will be renewed in the near future, after an acceptable lapse in communication). Yet negative interpretations are equally possible, whereby such a lapse is read as a sign that the interaction and the relationship are not working properly, and require various forms of repair. But there are different degrees of silence, various kinds of absence. Lapses in an ongoing interaction are shaped by the way the latter is mediated. For instance, electronic messaging technologies impose a strict sequentiality of turns, due to the need to validate a given move with the “send” function. In the case of exchanges relying exclusively on such mediations, it is impossible to make any sharp distinction between silence (if we see silence as a lapse in ongoing conversation) and absence (if we define absence as the mutual disengagement of participants from any kind of ongoing interaction). According to the particular temporal ordering of the sequence of interaction it is part of, separation can also be assigned different meanings. This is the case with the regimes of intermittent and connected presence. In

the former regime periods of absence and silence are accepted, for further encounters and contacts where participants will be able to work together to reinforce a shared perspective and their mutual commitment are expected to occur within a significant but conventionally acceptable time. In the extreme forms of connected presence by contrast, there is much more worrying and fretting about lapses between contacts: the only relief then comes from a constant stream of communication gestures between participants.

Acknowledgment

We are grateful to Michael Eve, who translated this text from French, for his helpful comments on an earlier version of the paper. We would like to thank members of France Telecom R&D Social Sciences Laboratory who at different moments extensively discussed the ideas developed in this text.

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