Interaction and Outeraction: Instant Messaging in Action

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ABSTRACT
We discuss findings from an ethnographic study of instant messaging (IM) in the workplace and its implications for media theory. We describe how instant messaging supports a variety of informal communication tasks. We document the affordances of IM that support flexible, expressive communication. We describe some unexpected uses of IM that highlight aspects of communication which are not part of current media theorizing. They pertain to communicative processes people use to connect with each other and to manage communication, rather than to information exchange. We call these processes "outeraction." We discuss how outeractional aspects of communication affect media choice and patterns of media use.

Keywords
Instant messaging, media theory, informal communication, computer-mediated communication, outeraction.

INTRODUCTION
Recent empirical work has shown the importance of informal workplace communication for effective collaboration. By informal we mean interactions that are generally impromptu, brief, context-rich and dyadic [16,34,35,36]. These interactions support joint problem solving, coordination, social bonding, and social learning—all of which are essential for complex collaboration [16,17,19,20,23,24,34,35]. This research demonstrates that face to face interaction is the primary means of informal communication in the workplace, though email is also gaining ground [18]. In this paper, we document the utility of a technology which is relatively new to the workplace—instant messaging—for effectively supporting informal communication.

In the first part of the paper, we describe the informal communication tasks that IM supports: quick questions and clarifications, coordination and scheduling, organizing impromptu social meetings, and keeping in touch with friends and family. These tasks usually involve rapid exchange of information or affect. We also document how the affordances of IM, in particular its immediacy, make it successful in supporting these tasks.

But IM does more than support quickfire informal communication. It facilitates some of the processes that make informal communication possible. In the second part of the paper, we explore unexpected uses of IM for what we call *outeraction*. Outeraction is a set of communicative processes *outside of* information exchange, in which people *reach out* to others in patently social ways to enable information exchange.

Current media theories describe processes by which people ground the content and process of communication [4,5], initiate interaction [28], or choose an appropriate medium for the task at hand [7,29]. These theories make a number of assumptions about the nature of communication: (a) that communication is primarily about information exchange; (b) that communication is best studied one interaction at time, rather than in a temporal sequence spanning multiple discrete interactions; (c) that participants are unproblematically available for communication; and (d) that a single medium is used throughout a communication event.

We document uses of IM that challenge these assumptions. First, we describe a distinct stage of communication prior to information exchange in which IM is used to *negotiate the availability* of others to initiate conversation, where the problem of interruptiveness is a major concern. Second, we document that some IM conversations take place in *intermittent* episodes, involving periods of time where no information is exchanged. Here IM is used to *maintain a sense of connection* with others within an active *communication zone.* Finally, we show that IM can be used to *switch media* in the course of a single communication event.

Other recent empirical and systems work on informal communication [16,26,35], awareness [8,13,14], and media spaces [2,10,11,21,22,30,36] has drawn attention to phenomena that relate to outeraction. One particular focus of this work has been conversational initiation. However, such work has yet to be systematically integrated with media theory. Drawing from our examination of IM use in the workplace, we illustrate that some of the conversational processes reported in other empirical studies also occur in IM. We report new conversational processes, and integrate this work with media theory. We contrast the outeraction

approach with other communication theories, such as ethnomethodology [28] and accounts of conversational grounding [4,5].

INSTANT MESSAGING SYSTEM FEATURES

Instant messaging is near-synchronous computer-based one-on-one communication. With a fast network, transmission times are fractions of a second and the experience is of near-synchronous interaction. Like chat, IM allows users to type messages into a window, but like the phone, it is based on a dyadic "call" model. Users do not go into "rooms" to converse with whomever is there; instead there is a single individual with whom they communicate (although they may have several concurrent dyadic conversations with different individuals in progress at a given time). Some IM systems support multiparty chat but our data concern the more typical dyadic communications. As with the phone, the intended recipient of an instant message may or may not "answer."

Most IM systems also provide awareness information about the presence of others. In AOL's Instant Messenger (AIM), the user creates a "buddy list" of people to monitor. A buddy list window shows whether buddies are currently logged into AIM, how long they have been logged in, and whether they are active or idle (and if idle, for how long). Other systems also provide 'buddy lists" but show only whether a buddy is logged in. Most systems also have audio alerts signaling when buddies come "online" and "offline." Users can control whether they appear on someone else's "online" buddy list; a "blocking" mechanism allows them to remove themselves from that list. The buddy list is also a convenient way to initiate IMs. Users double-click on the relevant name in the buddy list and a message is automatically initiated and addressed.

IM has ancient roots in Unix utilities such as "talk" and "write," but it has found a wide audience only in the last few years via AOL's Instant Messenger product, available free on the Internet. AOL claims to have 50 million AIM users [1]. Other IM products include Yahoo Messenger, Excite Messenger, Activerse Ding! and ICQ.

RESEARCH QUESTIONS AND METHODS

We investigated the IM usage of 20 people. Seven study participants worked at a large telecommunications company ("TelCo"). Twelve worked at an Internet company of about 700 employees ("Insight"). An additional participant was an independent contractor. People in our sample included executives in charge of technology transfer, a marketing specialist, graphic artists, software developers, Web designers, secretaries, and others. Usage of IM included colocated workers (often only a cubicle or two away); workers separated by as much as a nine hour time difference; and family members on opposite sides of the International Dateline. All the people we talked to were experienced users of a variety of technologies, including email, voicemail, PC and Web applications.

We asked informants about their jobs and their use of IM, as well as other communication technologies. We asked them to talk about the advantages and disadvantages of using IM, and how it compared with other communication media such as telephone, voicemail, email and face to face interaction. We audiotaped interviews conducted in informants' workplaces. We observed them at work in some cases, and videotaped some sessions. We were able to observe incoming instant messages as we conducted the interviews or observations. Users often received them while we were talking. They would sometimes pause and let us see a message, and show us their response if they chose to respond.

The bulk of our data is from interviews and observations supplemented with logs of a few IM sessions. These logs are drawn from one site only–at the other site the legal department prohibited the collection of logs. All informant names have been changed as have identifying details.

Informal Lightweight Communication

We present an example log to give a flavor of how IM was used for informal communication. The log shows a session between a secretary and her manager. Although names are changed, the timestamps, spelling, and punctuation are unaltered. The secretary, Melissa, and the manager, Alan, sat within earshot of one another, with Melissa in an open cubicle and Alan in an adjacent office. Melissa shared the cubicle with a secretary, Jackie, who worked for Alan's manager, Sam Jones.

melissa *(8:33:32 AM): The fire is out???????? [there has been an embarrassing public relations problem]*

Auto response from alan*: (8:33:32 AM): I'm idle...may be asleep. [Alan was there but working on another computer. The message was a personalized automatic response.]*

alan *(8:33:45 AM): not quite...still putting it out*

melissa *(8:37:13 AM): I can send some water. Just talked with Georgina....Marsha is running around with her head cut off!!!!!*

alan *(8:37:29 AM): just put Carl on my calendar at 10 am, for half-hour. [Carl was able to help solve the problem.]*

melissa *(8:37:45 AM): You got it!!!!!*

melissa *(8:38:43 AM): By the way....I can go to lunch if I can catch a ride with you...Beth has the car for lunch.*

alan *(8:38:56 AM): fine with me!*

alan *(8:39:12 AM): also, do you know when will sam jones be back?*

[Melissa turned to Jackie who kept Sam's calendar and asked her about Sam's schedule.]

melissa *(8:40:39 AM): Sam will be coming in on June 1 as of this moment*

alan *(8:40:56 AM): oh...not here this fri, eh?*

melissa *(8:41:11 AM): NO....He is in Hawaii at the moment.*

alan *(8:41:24 AM): right...for the shareholders meeting.*

melissa *(8:42:09 AM): You got it...Making Gail crazy needing paperwork from Stan's group yesterday at 4pm and they are out on an Offsite....*

alan *(8:42:34 AM): :-)*

In the last exchange "Making Gail crazy," Melissa was telling Alan that Stan was infuriating Gail regarding the late paperwork. This exchange updated Alan on the

emotional atmosphere of the office since he had been away the previous day. Alan returned a smiley face to acknowledge the joke that he knew that the paperwork was long overdue.

In this session, which spanned roughly ten minutes with fifteen brief exchanges, considerable work was accomplished. Alan and Melissa established context about "the fire," arranged a meeting with Carl, coordinated lunch, exchanged information about Alan's manager's schedule and the atmosphere in the office. This was done while other activities occurred, such as Alan taking a phone call and reading email. The conversation involved office jokes, expression of concern over a problem, simple patter ("oh...not here this fri, eh?"), and the asking and granting of a small favor.

As the log shows, the general tenor of instant messages is typically casual, informal, and friendly. One user contrasted it with email: "It's more casual so you can be more quirky." Relaxed grammar and spelling are the norm. Standard capitalization is often ignored though caps may be used for emphasis. Multiple exclamation points and question marks are sprinkled liberally throughout Instant messages. This informality lends Instant messages a kind of intimacy that is often absent from other types of mediated communication. In Melissa's exchange with Alan, she used multiple exclamation points to signal a friendly responsiveness ("You got it!!!!!"). Alan returned her query about lunch with a more subdued but still genial "fine with me!" In the interviews, Alan noted, "I use email more like the adult thing. IM is more the fun thing."

In a discussion comparing IM with email, Rick, a software researcher at TelCo, remarked on the informal, conversational flavor of many IM exchanges. He suggested that a key reason for this informality lies in the near-synchronous nature of IM. Conversations can be more interactive because the rapid and evolving nature of IM means that there is immediate context for the current interaction. This context seems to reduce misunderstandings and promote humor. "The give and take of a conversation in IM is much more immediate [than email] and you can tell by the way it's evolving what people's intentions are or what they probably mean because you have context. That helps to shape a context be it light and bantering or certain statements that are meant to be tongue-in-cheek."

Another reason IM interactions tend to be informal is that users typically interact with a small set of people they know well, or plan to get to know well. The buddy lists in our sample averaged twenty-two people, with six friends/family and sixteen coworkers. In practice, participants in our study usually interacted with only four or five of their buddies on a frequent basis. (Teen practice appears to vary in that buddy lists are much larger). The fact that participants are familiar with each other may contribute to this relaxed and informal conversational style.

Communicative Functions of Instant Messaging

A central use of IM was to support *quick questions and clarifications* about ongoing work tasks. Helen, a web page designer at Insight, characterized this use of IM: "Say I'm working on a project and I want a quick response. [I use IM] rather than waiting for an email or try to contact them by phone and get into the process of having a lengthy conversation when you just want a two second response. I do that really often." At Insight it was common for workers developing Web pages to send each other instant messages to inquire about matters such as the placement of a logo on a page, or a small change in wording. Terry, a programmer at Insight described this process of getting IM requests for small changes to web pages, quickly making the changes, making it possible to get immediate feedback on the results: "Often we can do stuff in real time. So, I'll get a request, I'll fire up the code, make a change ... I'll say, 'Hang on a second,' and then make the change and I have a development server and so I'll cut and paste the URL back into [IM] and say, 'Here, check this out'." An important reason for choosing IM over other media for this activity is its efficiency: IM allowed more rapid exchanges than is possible with email but without the overhead of a full-blown face to face conversation.

IM was also used frequently for *coordination and scheduling*. Again a key reason for using IM was its *immediacy*: when scheduling, it is important to know the details of someone's calendar as soon as possible. Sending an email that may not be read for an hour or more may mean that a previously open schedule slot has disappeared and the entire scheduling interaction has to be reinitiated. Laura, an administrative assistant at Insight, described it this way: "You have to [IM] an admin and ask if that person has this time open. They [IM] back and say 'yes,' and then you schedule it right then. Otherwise someone may come in the meantime. An email would be too slow because of lag time. Most of the admins have [IM] and it's faster than calling, although that works sometimes too."

Some users commented that they were able to carry out efficient exchanges because IM enabled them to eliminate certain formalities of address associated with phone and email. Laura from Insight said: "There are all the formalities that are bypassed on [IM] because it's not necessary. Because [IM]'ing them is the same as calling and part of the 'hi, how are you?' is trying to figure out who it is but with the name coming up in IM, you know who it is. Automatically you've identified who it is and what they want in the first line. It's a lot faster."

The visibility of IM also contributes to greater efficiency for tasks requiring rapid responsiveness. This visibility served as an important alerting mechanism making recipients more aware of instant messages, than messages sent in email and voicemail. They were likely to respond more quickly in consequence. Diane, a marketing specialist at Telco, said of her IM interactions with her secretary: "She'd respond faster. When I call her, she's not there and

I'll leave a voicemail and she might not get to the voicemail as quickly. Or she's on the phone and I'll have to leave her a voicemail. When she sits down, the IM will be on her screen and it's more likely she'll do something with that before she does other stuff at her computer. Emailing would be a waste because she might check her email only once a day." While visible alerting was considered by most of our users to be a useful affordance, several users complained that it could be distracting when they were working to important deadlines. On these occasions they sometimes resorted to shutting IM down.

IM was also used to *coordinate impromptu social meetings* that took place face to face. The pressures of work in today's world make socializing at work more difficult, but no less important. People still like to go to lunch with one another, and one of the key uses of IM at both our sites was trolling for lunch partners and coordinating lunch plans. In a previous log we saw how Melissa inserted a discussion about lunch into the middle of more serious matters. People would also use IM to arrange to meet others for coffee breaks during the day. Many of these arrangements were made on the spur of the moment. The immediacy of IM meant that participants could determine each others' availability at very short notice. IM was preferred to email and voicemail for making such arrangements because these media may not be accessed immediately.

Another frequent use of IM was to *keep in touch with friends and family* while at work. Most IM users in our study had at least some friends and family they connected with online during the course of the workday. These interactions were often very brief, like, "Hi Hon!" Such interactions seemed to provide a moment of respite in a busy day, a sort of "pat on the shoulder" as one participant said. Users had exchanges with friends about coordinating social activities, such as organizing a camping trip, or a visit to a restaurant. Mike explained, "My roommate just came online and she can say 'hi.' She can also say what her plans are or if she needs something." IM injected playfulness and intimacy, easing workers' labor by allowing them to connect to loved ones in quick but meaningful ways. Mike observed, "[IM] is a nice break from the work that can be mundane." We are all aware of the way work continues to cross boundaries into the home, but the reverse is true too, with home (and friends) making their own inroads into the workplace.

To summarize, we observed people using IM for short questions and clarifications, coordination and scheduling, arranging impromptu social meetings, and keeping in touch with friends and family. Two things are striking about all these interactions. First is the *flexibility* of IM in terms of the work that it supports. It is used here for clarifications, coordination, task delegation, asking and granting social favors, and tracking others' schedules and arranging social meetings. Second, IM is *expressive*, allowing for affective communication about a work crisis, the general ambiance of the office, jokes and bantering, as well as intimate communication with friends and family. It is interesting that a lightweight technology consisting of no more than typing text into a window succeeds in providing enough context to make a variety of social exchanges vivid, pleasurable, capable of conveying humor and emotional nuance.

IM interactions share many of the characteristics of informal face to face communication, being opportunistic, brief, context-rich and dyadic [16,35]. Further support for this view is provided by the fact that IM and certain types of face to face interaction were sometimes seen as interchangeable. For example, in the early morning before others arrived in the office Melissa and Alan would often call back and forth to each other out loud, holding the same types of conversations we have documented here. When the office started filling up, they switched to IM, not wanting to disturb others in the work environment with audible informal conversation.

Most people in our study were enthusiastic about IM, but three were "resistors." Two refused to use IM at all. One felt she needed a record for all her communications so she preferred email. Another was a user interface designer who found the interface of her IM tool distasteful (she referred to herself as "a user interface snob"). A third user did not like to use IM when working at home, preferring to work without interruption there. Further work would be necessary to develop general statistics on preferences for IM in the workplace.

We now turn to an entirely different and unexpected set of uses of IM, namely to support *outeraction.* Because informal conversations are not scheduled, *negotiating conversational availability* is problematic [9,10,16,30,34,35]. *Establishing social connection* is a critical prelude to interaction. Often informal conversations are comprised of intermittent interactions, so effort must be expended to create and maintain connection with others, and to *preserve a sense of conversational context* between interactions [16,35,36]. Once in an interaction, participants must *manage the communication situation* as it unfolds. Together these outeraction processes form the superstructure that facilitates informal communication.

NEGOTIATING CONVERSATIONAL AVAILABILITY

How do conversational participants get themselves into a situation where they are available for information exchange? Given the impromptu nature of informal communication, a key problem is to locate and get the attention of the person with whom one wishes to converse. About 60% of workplace phone calls fail to reach intended recipients because they aren't there, or they are already talking to someone else [25,27,30,35].

A second recurring difficulty with initiating an informal conversation is *interruptiveness.* Since informal conversations are normally opportunistic, the recipient may well be present, but the request to talk occurs at an

inconvenient time because the recipient is engaged in another task or conversation. This gives rise to a fundamental asymmetry in conversation: the time and topic are convenient for the initiator, but not necessarily the recipient [25,34]. This asymmetry arises because while initiators benefit from rapid feedback about their pressing issue, recipients are forced to respond to the initiator's agenda, suffering interruption. Our participants were emphatic about the problems of interruptiveness, particularly with respect to the phone. Face to face communication was also mentioned as potentially interruptive—characterized by one informant as "in your face."

IM helped people negotiate availability by allowing conversational initiators to judge whether recipients were on-line by consulting the buddy list. More importantly, IM provided recipients with greater control in deciding whether and when to respond to a message.

Several informants talked about checking the buddy list to see whether recipients were active before sending a message. Helen from Insight said, "First thing this morning I opened it up [the buddy list] and looked to see who was online. My boss was online and I saw that people in Commerce were online. Other designers were online and I knew that there was a certain person that I wanted to contact and she wasn't there so I knew that I could check later." This type of availability information was also useful when trying to track down people who were difficult to find by other means. Keith, a marketing manager at TelCo, described how he used IM availability information to get in touch with Stan, an elusive coworker on the opposite coast: "Last Friday I was on and left two messages for Stan saying I wanted to come out and talk with his people and got no response. Stan is one of my people on here [on his buddy list] and I saw his "Stannies" come up and said: 'Hey Stan. Got time to talk?' And he said, 'Darn. When you turn these things on, people actually find you.' He had turned it on to get a message from his daughter who was having a track meet and he was hoping she would reach him. When he did, I caught him and I asked if we could talk and he said he was busy for five minutes and he'd call me back. He called me and we accomplished what I needed to do for my visit here today." This use of IM is similar to instances to "waylaying" observed in media spaces where initiators with a pressing question leave open a video link so that they can determine the minute the recipient returns to their office [10,11].

Preambles

The buddy list helped conversation initiators judge when recipients were likely to be available and thus partially addressed the problem of connection failure. A more significant benefit of IM accrued to the *recipient*: IM reduced interruptivity by allowing recipients to negotiate availability. One user noted that with IM it is possible to contact others in a way that "interrupt[s] them without interrupting them too much" (see also [3]). And unlike the phone, instant messages were easily screened and responded to, even when users were engaged in face to face conversation with others in their offices. Initiators of instant messages often checked to see whether recipients were active before sending a message. If an initiating message arrived at an inconvenient time, recipients would often ignore it until they were ready to converse. Many IM conversations therefore took the form of *preambles* where initiators attempted to determine the preparedness of recipients for IM interaction. Often people would send simple instant messages like, "Suzi?" to see if someone was available for an IM exchange. If the recipient responded, an "attentional contract" was established in which both parties explicitly agreed that the communication could proceed.

The usefulness of IM as a technique for negotiating availability is shown by the fact that instant messages were often used to negotiate availability for conversations *in media other than IM*. For example, many informants used instant messages as preambles for phone conversations. While in informants' offices, we observed preambles such as "Is this a good time to call?" and "Are you there?" Rick of TelCo noted, "...a typical [IM] conversation would be talking about 'is X a good time [for a phone conversation]'? [If yes,] we'll upgrade to a phone conversation." Another TelCo informant noted that for him IM was often "a preamble to a more formal conversation" that took place on the phone. These transitions from IM to the phone happened sufficiently frequently that at Insight they were incorporated into the system: people edited their buddy lists to include phone extensions.

IM was also used to negotiate when to have face to face conversations. "Colocated" workers are often distributed on large campuses across many buildings. IM made face to face communication more efficient by allowing people to quickly establish whether a face to face meeting was feasible. IM was considered less intrusive than calling on the phone or dropping by.

Negotiating availability may involve use of multiple media in parallel. Instant messaging is often monitored *while other communications are taking place* such as phone calls or face to face conversations. This lets people prioritize communications and maintain awareness of events while they are attending to other tasks. Such monitoring is more difficult with other media; for example, it is not easy to respond to a phone call and carry on a face to face conversation simultaneously (though sometimes this happens). Likewise, it is difficult to read email and carry on a face to face conversation. In contrast, monitoring IM while conversing in other media is reasonably easy. Laura noted, "If you're talking to somebody and picking up the phone, that's a lot more destructive than seeing the IM and not answering it...you still know what's going on."

Most of the workers we studied felt they could ignore incoming instant messages without offending the sender. People may feel able to do this because the sender

generally doesn't know for certain whether the intended recipient is there or not. As a result, failing to respond is not necessarily interpreted as rude or unresponsive. IM therefore provides *plausible deniability* about one's presence. Ryan, a software developer at Insight, commented, "One thing I like about [IM] is that I'll see a message but I won't have to acknowledge my presence. So I'll respond to them later when I have time."

Informants reported that there were fewer costs associated with delaying a response to an IM, compared with other media. If the message is temporarily ignored, it stays up on the user's computer screen as a reminder (see also [30,36]). It can be responded to later by simply typing into the window. Responding to an instant message is consequently extremely lightweight compared to the effort of dialing in to retrieve and respond to a voicemail message or finding someone face to face at just the right moment for a conversation. Helen, at Insight said: "You can choose if you want to respond. It's like voicemail but more accessible. I can choose not to respond for a while. It [the message] is still sitting there. I don't have to go in, get my messages...It's a nice, clean, easy way to communicate."

In contrast, people often feel compelled to answer the phone because they do not know the identity of the caller or their reason for calling (although this is mitigated somewhat by caller-ID). Alan observed, "So the phone can be a very intrusive thing, whereas IM is a lot friendlier because it's just a quick thing of, 'Are you there and available' or very short questions. I don't mind that interruption. With a phone call, you don't know if it's really urgent because there's no way to know who's calling, whether it's urgent and what the topic is." An IM is also typically from someone on the user's buddy list. It is therefore already partially screened and less likely to be an irrelevant distraction.

Together, ease of screening, delayed responding, and plausible deniability of presence allow recipients much more control over responding than with face to face interaction or the phone. This greater control redresses the fundamental communication asymmetry in informal communication. Instead of conversations taking place at the convenience of the initiator, IM allows genuine social negotiation about whether and when to talk. The attentional contract can be negotiated on a more equal footing between initiator and recipient than with face to face or phone interaction. This may explain why IM is often used to negotiate availability for phone calls and face to face conversations.

COMMUNICATION ZONES IN INTERMITTENT CONVERSATIONS

In addition to the rapid exchanges characteristic of IM usage, we also observed that IM was often used in a completely different way to hold *intermittent conversations* over longer periods of time. The fact that recipients can choose when to respond gave rise to an intermittent, slower paced style of IM conversation. Some IM conversations took place over several minutes or even hours as recipients had the freedom to choose when to respond. "I find IM allows it to be a longer period of time, more topics, more ability to formulate the whole discussion as opposed to with a phone call….I never feel on IM that I've got to find something to say back. It's okay if it sits there and we don't talk for awhile or if I head back to my email for awhile."

IM participants seemed to establish longer term "communication zones" within which they could move in and out of informal conversations. IM was used to create a virtual environment similar to a shared physical office, where people engaged in work related tasks, interspersing sporadic interchanges throughout their individual work [3,6,9,14,15,26]. IMs are persistent and visible which helps preserve ongoing conversational context. This makes intermittent exchanges more straightforward, allowing participants to attend to other tasks and then return to an IM ("It's okay if it just sits there").

Study participants contrasted the intermittent nature of these IM conversations with phone calls which were seen to be more circumscribed and lacking in IM's emergent, more discursive character. Keith, put it this way: "You [IM] for five minutes and then you do something and communicate again. It doesn't have to be a continuous, make sure you've got everything thought through [conversation]. I very often like it more than a phone call because a phone call is like: 'Okay. We've got five or ten minutes to talk.' But if we're both on Instant Messenger in the evening, when anything comes up we can sort of ding the other person with it." Our participants also contrasted intermittent instant messages with the exchange of emails over similar periods of time. Intermittent instant messages were thought to be more immersive and to give more of a sense of a shared space and context than such email exchanges.

These observations are similar to the "virtual shared office" that is characteristic of open video links [9,10,11,21]. However, key differences between IM and video are that IM supplies contextual information by providing a record of conversation, and allows plausible deniability of presence affording greater participant privacy. This style of conversation, with extended periods of time when no information is exchanged, contrasts with the focus on discrete bounded communication events in current media theory.

AWARENESS MOMENTS

Another process of outeraction is creating and maintaining a sense of social connection to others. While not involved in direct information exchange, participants often used IM in indirect ways to create and maintain a sense of connection to others by monitoring the buddy list. Somewhat to our surprise, we found that people found value in simply knowing who else was "around" as they checked the buddy list, without necessarily wanting to interact with buddies. Other research into technologies to support generalized awareness reports similar observations

[8,13]. These *awareness moments* produced a certain *feeling* in people, rather than accomplishing information exchange. For example, Alan discussed monitoring his buddy list for this reason: "You feel like you know where other people are, so you feel like you're not the only one working on a weekend. To me it's just fascinating to know that someone else is somewhere else doing something while you're doing something. You feel like you're in this world together so this creates a little universe." Alan's discourse employed a spatial metaphor, denoting a sense of occupying a "world," a "little universe," and "knowing where people are." He used the word "feel" three times in this short segment underscoring that he was not talking about accomplishing a specific task, but about how he felt.

Rick also talked about how awareness information helped him form a closer bond with his coworkers: "You can see when people log in and out and when they're off to lunch. It's kind of neat to watch people's comings and goings and it's not so much tracking it but you hear the sound of the door clicking and notice that somebody that everybody's looking for is back …. you get a visual image in your mind of that person and I feel closer to the people I work with as a result of that." Again, Rick reported a feeling. The mere sound of a simulated door opening and closing led to a "visual image in [his] mind" that fostered closeness.

Colocated workers maintain a sense of others as they are opportunistically encountered in shared spaces such as coffee rooms or hallways [2,8,10,16,20,30,34,35]. But for people collaborating at distance, such encounters are rare. Rick, with colleagues on the opposite coast of the US, made the argument that IM can partially address this problem: "I tell people about [IM] because it helps overcome some social problems you experience when you're a thousand miles away from your coworkers. Things like forgetting that they're there."

Some participants also achieved similar effects of social connection through brief social greetings sent in IM. For example, some people sent "Good morning" messages in IM. They noted that it would be considered lunacy to deliver a "Good morning" message in email, but that people appreciated a quick IM greeting. Mike, a graphic artist at Insight, said, "Lana is two cubes away but she messages me all the time. It's a nice way of saying 'hi' without being too intrusive." Note that the exchange of greetings does not involve substantive information exchange. The aim of greeting exchanges was not to inform others about a fact or a task but to engender a sense of closeness and connection. Alan described his weekend use of IM:

Alan: On weekends I occasionally log on from home and Rick is working and I say hi.

Interviewer: What's the purpose of that?

Alan: Just to say hi. There's no purpose and nothing to say.

Of course the purpose was to have a quick social moment with a valued coworker.

People also used IM as a parallel communication channel to establish an affective atmosphere that contributed to a feeling of social connection. During phone conferences, colocated participants often had "sidebar conversations" in which they sent messages such as, "I can't believe he said that!" They would also use IM during phone conferences to do things like place orders for lunch (with a designated lunch gofer), while conference participants in other time zones were far past lunch. This private subgroup activity lent an atmosphere of bonhomie for the colocated participants while also accomplishing the instrumental task of getting the lunch ordered. Two participants likened this style of instant messaging during phone conferences to "passing notes in school."

Awareness moments argue for a richer notion of communication than current media theories allow. Even when no direct information exchange is taking place, people want to maintain connection with others, outside the context of specific events of information exchange.

MANAGING CONVERSATIONAL PROGRESS

A final manifestation of outeraction realized in IM was managing conversational progress in the form of deciding to change communication media during an interaction. Often participants would begin an IM interaction and then elect to change the communication medium to phone, face to face or even email. We call this phenomenon *media switching*. The following exchange (drawn from a log of our own use) is characteristic of many of the exchanges we observed while in people's offices:

BonniNardi *(3:43:37 PM): John,*

JohnatSun *(3:50:19 PM): Hi, I'm back [a seven minute gap before he replies to Bonnie's message]*

BonniNardi *(3:50:34 PM): Hey, I'm getting my system reconfigured and lost Sally's AIM name.*

JohnatSun *(3:50:57 PM): Her name (surprisingly) is Sally Smith (with a space between).*

BonniNardi *(3:51:07 PM): Duh. Well, thanks. How are things going?*

JohnatSun *(3:51:27 PM): Umm, a little hectic, not for work stuff, but hey, I have a question, can I call you?*

BonniNardi *(3:51:31 PM): sure.*

JohnatSun *(3:51:35 PM): at work?*

BonniNardi *(3:51:39 PM): yes.*

JohnatSun *(3:51:51 PM): can you save the trouble of looking up the #*

BonniNardi *(3:52:00 PM): 463-7064*

In this interaction, a preamble ("John,") is followed (several minutes later) by the exchange of a small bit of information (Sally Smith's AIM name), and then the proposal of a media switch, an opportunistic request for a telephone call. The phone was judged to be more suitable for the longer conversation that John had in mind. Note that John asked for the phone call after Bonnie provided an opening for a longer conversation with the question, "How are things going?" John judged the moment to be a reasonable time to request a longer conversation, using a

different medium.

Why do people feel the need to switch media? People talked about switching when they felt that "interaction" was needed, if the conversation was "complicated," or if there was a misunderstanding in the IM. On other occasions they felt it was just more efficient to talk than type. Alan at Telco was asked when he switched: "When it takes me more than three lines to type. Part of it is when it's too complex because it would take more time typing it than talking about it—I remember occasions when I was in New York and Rick was here and we were just talking back and forth even though it was simple things. At some point in time, we were doing this for five minutes and we thought maybe we should just talk. So when it becomes too lengthy. I really see this more for short messages. Almost like single line answers would probably work best."

Other times the inefficiency of typing was associated with the need to have access to the same visual shared workspace. Helen from Insight described it this way: "Let's say that I'm [IM]ing someone I'm working on a project with and it gets to the point where we have to talk. I'll write that I would rather come over and sketch it out or talk in person—it's getting too hard to type so fast and it's getting too detailed." Media switching reveals another element of conversation outside of information exchange. When IMing, participants were constantly monitoring the progress of an interaction and making corrective suggestions to switch media where necessary. The outeractional work of managing conversational progress shows how participants "step outside" ongoing information exchanges to monitor and transform interaction via media switching.

DISCUSSION

Our findings on the importance of negotiating availability, sustaining social connections, switching media, and retaining context in workplace conversation suggest areas of expansion for communication and media theories. Current theories orient to information exchange. We believe that information exchange must be located within a wider scope of outeraction, that is, processes outside of information exchange in which people reach out to others in social rather than informational ways. Information exchange is only made possible through outeractional processes including delicate negotiations about availability, finding ways to establish connection by inhabiting and maintaining a shared communication zone, and the continual work of managing the progress of an interaction, including switching media.

We can think of outeraction as a series of *linked processes* that interleave and feed back on one another. Awareness moments create personal connections that lay the groundwork for interactions, drawing people into a common communicative arena. The process of negotiating availability binds people more tightly together for a specific interaction as they establish an attentional contract. The management of conversational progress during a specific conversational event enables people to direct conversations in ways they deem appropriate as the conversation unfolds. Communication zones delimit a virtual "space" in which a series of conversations can take place. These processes describe dynamically changing looser and tighter links that scaffold information exchange.

Our work overlaps somewhat with research on grounding conversational processes [4,5] and ethnomethodological analyses of opening and closing conversations [12,14,28]. These accounts, however, do not address key aspects of outeraction—the phenomena of media switching and awareness moments, and the creation of communication zones stretching across individual interactions, as we saw in the intermittent conversations in IM.

Our description of negotiating availability is concerned with the same problem of starting a conversation taken up by these theories [5,12,14,28]. In grounding and ethnomethodological accounts, as people enter conversations they follow well-known rules to coordinate the entry smoothly. Joint commitments are established as participants agree that they will converse on a particular topic [5]. While rules of conversation and joint commitments are certainly important, these constructs tend to privilege unproblematic conversational entry through the smooth function of mechanisms such as the summons-answer adjacency pair [5,28]. With few exceptions [12,14], this work assumes that initiators already know that the recipient is present and will acknowledge the initiation attempt. We have shown, however, that in IM such acknowledgments are not guaranteed: recipients may be absent or exploit plausible deniability of presence to ignore the summons to converse. These accounts do not consider the problem of participant asymmetry; on the phone or face to face, people may feel compelled to accept conversational offers even when they do not wish to, while in IM this problem is eased. Our work characterizes a distinct stage and set of problems prior to information exchange by which participants establish and negotiate the presence of the recipient, using careful strategies to manage tensions and problems of conversational initiation.

The symbolic interaction perspective of Trevino et al. [31] discusses some of the social aspects of outeraction in positing symbolic reasons for media choice. These reasons include, for example, showing "a desire for teamwork, to build trust, or convey informality... urgency,...personal concern...or [deference]." However, the language of this perspective still emphasizes information transfer rather than relational and affective aspects of communication. The authors observe, "Managers apparently pick face to face to signal a desire for teamwork, to build trust, [etc.]." Managers are "sending signals" to recipients rather than creating and activating conversational linkages and flows in communication zones, as in outeraction.

As well as these theoretical observations, there are a number of important technology implications to our work.

IM was highly versatile in supporting awareness, negotiating availability, intermittent conversations, and flexible informal communications. This argues strongly for the integration of text-based messaging into technologies such as media spaces which aim to support informal communication for people collaborating at distance. With some exceptions [30,33,36], most media spaces do not have integrated text-messaging.

More specifically, IM might facilitate the initiation of conversation. In many media spaces initiation is supported by video. Using IM to negotiate availability may address major problems observed with using video to initiate informal communications between remote collaborators [10,14,21,30,34,35]. In these studies, initiators used video to "glance at" recipients to determine their availability. If accepted by recipients, glances could be converted to full-blown audio/video conversations. However, with video there was no chance for plausible deniability of presence and these systems failed to provide more successful initiation than phone only communication [30,34]. Paradoxically, an interface that provides *less* awareness information may be more successful because it addresses the problem of participant asymmetry**.** A second benefit of IM over video systems is the persistence of textual conversation which maintains conversational context and facilitates intermittent interaction, leading to a more robust communication zone.

Another promising area for technical innovation is phone and IM integration. Given the utility of IM for negotiating availability, IM could be integrated with the phone allowing participants to negotiate availability so as to provide less interruptive initiations of phone calls. This may reduce the current high failure rates in initiating work phone calls [25,27,30,34,35]. The use of IM for creating parallel channels during audio conferences also suggests a separate new application that automatically creates a parallel IM link between people already engaged in a phone call or audio conference. An IM link such as this could be used for private "off-line" conversations, or for the exchange of information (such as URLs) more suited to textual transmission.

In conclusion, we have documented the flexibility and expressivity of IM for various informal communication tasks. We have described the unexpected use of IM for outeraction processes that are distinct from but essential for information exchange. Our work suggests that we broaden theoretical accounts to include multiple facets of communication: interaction, information exchange, symbolic signals, and outeraction. More research is needed to document processes of outeraction in other media. Future work will provide a more integrated view of these multiple facets of communication.

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REFERENCES

1. AOL Instant Messenger Home Page ht.//www.aol.com/aim/home.html
2. Bly, S., Harrison, S., & Irwin, S. (1993). Media spaces: Bringing people together in a video, audio and computing environment, *Communications of the ACM*, 36, 28-45.
3. Bradner, E., Kellogg, W., & Erickson, T. The adoption and use of BABBLE. *Proceedings ECSCW'99, European Conference on Computer Supported Cooperative Work*, 139-158. Dordrecht, The Netherlands: Kluwer Academic Publishers.
4. Clark H., & Brennan, S. (1991). Grounding in communication. In L.B. Resnick, J. Levine & S. Teasley, Eds. *Perspectives on socially shared cognition.* Washington DC.: APA Press.
5. Clark, H. (1996). *Using Language*. Cambridge: Cambridge University Press.
6. Churchill E., & Bly, S. (1999). "It's all in the words": Supporting activities with lightweight tools. *Proceedings of GROUP99*, 40-49, New York: ACM Press.
7. Daft, R., & Lengel, R. (1984). Information richness: a new approach to managerial behavior and organizational design. In B. Straw and L. Cummings (Eds)., Research in Organizational Behavior, 6, Connecticut: JAI Press.
8. Dourish, P., & Bly, S. (1993). Portholes: Supporting awareness in a distributed work group. *Proceedings of CHI'93 Human Factors in Computing Systems*, 541-547, New York: ACM Press.
9. Dourish, P., Adler, A., Bellotti, V., & Henderson, A. (1996). Your Place or Mine: Learning from long-term use of audio-video communication. *Computer Supported Cooperative Work*, 5(1), 33-62.
10. Fish, R., Kraut, R., Root, R., & Rice, R. (1992). Evaluating video as a technology for informal communication, In *Proceedings of CHI'92 Human Factors in Computing Systems*, 37-48, New York: ACM Press.
11. Gaver, W., Moran, T., MacLean, A., Lovstrand, L., Dourish, P., Carter, K., & Buxton, W. (1992). Realizing a video environment: EuroParc's RAVE system. In *Proceedings of CHI'92 Human Factors in Computing Systems*, 27-35, New York: ACM Press.
12. Goodwin, C. (1981). *Conversational organization: Interaction between speakers and hearers.* New York: Academic Press.
13. Gutwin, C., & Greenberg, S. (1998). Design for individuals, design for groups: Trade-offs between power and workspace awareness. In *Proceedings of CSCW96 Conference on Computer Supported Cooperative Work*, 207-216, New York: ACM Press.
14. Heath, C, & Luff, P. (1991). Disembodied conduct: communication through video in a multimedia environment. In *Proceedings of CHI'91 Human Factors in Computing Systems*, 99-103, New York: ACM Press.
15. Heath, C., & Luff, P. (1992). Collaboration and control,

Computer Supported Cooperative Work, 1, 65-80, Amsterdam: Kluwer.

16. Kraut, R., Fish, R., Root, R. & Chalfonte, B. Informal Communication in Organizations. (1990). In S. Oskamp and S. Spacapan, (Eds).*People's Reactions to Technology in Factories, Offices and Aerospace*. New York: Sage.
17. Kraut, R., & Streeter, L. (1996). Co-ordination in software development. *Communications of the ACM*, 38**,** 69-81.
18. Kraut, R. E. & Attewell, P. (1997). Media use and organizational knowledge: Electronic mail in a global corporation. In S. Kiesler (ed.) *Research Milestones on the Information Highway*. Mahwah, NJ: Erlbaum.
19. Markus, L. (1994). Finding a happy medium: Explaining the negative effects of electronic communication on social life at work. *ACM Transactions on Information Systems*, 12, 119-149.
20. McGrath, J. Time Matters in Groups. (1990). In J. Galegher, R. E. Kraut, & C. Egido (Eds.), *Intellectual teamwork: Social & technological foundations of cooperative work.* Mahwah, N.J.: Lawrence Erlbaum.
21. Mantei, M., Baecker, R., Sellen, A, Buxton, W., Milligan, T., & Wellman, B. (1991). Experiences in the use of a media space. In *Proceedings of CHI'91 Human Factors in Computing Systems*, 203-209, New York: ACM Press.
22. Nardi, B., Kuchinsky, A., Whittaker, S., Leichner, R. & Schwarz, H. (1996). Video-as-data: Technical and social aspects of a collaborative multimedia application. *Computer Supported Cooperative Work* , **4**, (1), 73-100.
23. Nardi, B. & Engeström, Y. (1999): A Web on the Wind: The Structure of Invisible Work. In *Computer-supported Cooperative Work*, **8**, 1-2. Special issue, Nardi, B. and Engeström, Y., guest eds.
24. Nardi, B., Whittaker, S. & Schwarz, H. (in press). A Networker's Work is Never Done: Joint Work in Intensional Networks. *Journal of Computer-supported Cooperative Work.*
25. O'Conaill, B., & Frohlich, D. (1995). Timespace in the workplace: Dealing with interruptions. *Proceedings of CHI'95 Human Factors in Computing Systems*, 262-263, New York: ACM Press.
26. Olson, G.M., & Olson, J.S. (in press). Distance matters. *Human-Computer Interaction*.
27. Rice, R. & Shook, D. (1990). Voice messaging, co-ordination and communication. In J. Galegher, R. Kraut & C. Egido Eds. *Intellectual Teamwork: Social & technological foundations of cooperative work.* Mahwah, N.J.: Lawrence Erlbaum Press.
28. Schegloff, E. (1972). Sequencing in conversational openings. In J. Gumperz and D. Hymes (Eds.), *Directions in Sociolinguistics: the Ethnomethodology of Communication*, 346-380, New York: Holt Rinehart and Winston.
29. Short, J., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications.* New York: Wiley.
30. Tang, J., Isaacs, E., & Rua, M. (1994). Supporting distributed groups with a Montage of lightweight interactions. *Proceedings of CSCW '94 Conference on Computer Supported Cooperative Work*, 23-34, New York: ACM Press.
31. Trevino, L., Lengel, R. & Daft, R. (1987). Media Symbolism, Media Richness, and Media Choice in Organizations. *Communication Research* 14, 5: 553-574.
32. Walther, J. Interpersonal effects in computer mediated communication (1992). *Communication Research*, 19, 50-88.
33. White, S. A., Gupta, A., Grudin, J., Chesley, H. Kimberly, G., Sanocki, E. (1999). Evolving Use of A System for Education at a Distance, *Proceedings of CHI99 Conference on Human Factors in Computing Systems*, 274-275, New York: ACM Press.
34. Whittaker, S. (1995). Rethinking video as a technology for interpersonal communication, *International Journal of Human Computer Studies*, **42,** 501-529.
35. Whittaker, S., Frohlich, D. & Daly-Jones, W. (1994). Informal Workplace Communication: What is it Like and How Might We Support It? *Proceedings of CHI'94 Conference on Human Factors in Computing Systems*, 131-137, ACM Press: New York.
36. Whittaker, S., Swanson, G., Kucan, J., & Sidner, C., (1997). Telenotes: managing lightweight interactions in the desktop. *Transactions on Computer Human Interaction*, 4, 137-168.