The Situated Behavior of MUD Back Channels

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Abstract

Back channel responses are normally taken to indicate either comprehension of a speaker's plans or recognition of a speaker's ongoing construction of a complex discourse structure. I investigate their use in the discourse of a social MUD ("multi-user dimension") where paralinguistic information is missing, and users create a sense of co-presence through the use of conventional responses that imitate back channels in face-to-face speech. Back channels are found to be present in periods with relatively little interaction, suggesting they function as measures of the attention state of an interlocutor as much as a measure of plan recognition.

Introduction

Studies of face-to-face conversation provide particular problems for discourse analysis. Transcription conventions are theory dependent, and notation systems often fail to take into account aspects of paralanguage that are communicative, like gestures, gaze direction, prosody. Phone-mediated communication, which avoids some of the problems posed by the visual and proxemic possibilities in face-to-face dialogue, has a respectable breadth of study (e.g., Schegloff 1968, Oviatt & Cohen 1988), but for the most part the effects of mediation on conversation have not been discussed, and the organization of communicative information over available channels and modalities has been neglected as a question of study. (Goffman 1953) suggests that "face-to-face interaction does not seem to present a single important characteristic that is not found—at least within certain limits—in mediated communication situations" (p. 113). The rearragement of that information when communication channels are different or missing yields interesting insights into the process of conversation.

This study focuses on electronically mediated communication: conversation recorded in ethnographic study of a MUD ("multi-user dimension"; Curtis & Nichols, 1993) over a period of one year. MUDs are becoming increasingly interesting to industry and academia as places for long-distance collaboration (Xerox PARC's Jupiter), for long-distance teaching and constructivist learning (Diversity University, MOOSE Crossing), for networking among research colleagues (BioMOO, MediaMOO), and as real-time long-distance conference extensions (SchMOOze at Super-Computing 94). MUD conversation is entirely conducted in text, in a virtual environment modelled after the metaphor of physical geography. Users interact via "characters" who can only "hear" things said by other characters in the same "room" with them, or sent to them via long distance private "pages" which do not respect room boundaries.

MUD discourse is easily transcribed by saving logs of the interactions; no theory-laden transcription systems need be invoked. The medium therefore offers a fine opportunity to study synchronous, naturally occurring communication over a single channel, text. The environmental context for all conversations consists solely of the objects in the MUD.

Early studies of written and spoken language (see, e.g., Chafe 1982) found significant differences between the two. For instance, writing is supposedly more detached, organized, decontextualized, impersonal, and elaborate than speech. More recent analyses of the two find that the differences correspond to the differences between edited and spontaneous texts (e.g., Biber 1986). MUD conversation, highly situated in a personal context and occurring in real time, shares many similarities with spoken language, since it is fairly spontaneous. However, the unavailability of paralinguistic information, intonational cues, and reliable sequential ordering result in several interesting features. The constrained medium forces users to be explicit in text about information that is ordinarily more subtly distributed across other channels, like the class of back channel responses from hearers to speakers. However, given the lack of simultaneity in access to the channel (since each text message shows up in its entirety only after the user pushes "return" and the network gets it to the server), large differences in turn-taking and repair strategies, for instance, are created by the medium. The differences are interesting, however, in that they reveal social behaviors reorganized for new interactional situations.

MUD Conversation

The data I discuss in this paper were gathered during ethnographic participant-observation of a community on an object-oriented MUD, RaysHouseMOO.[1] All conversations were natural, non-prompted, situated in their normal context. There is a regular community of users on RaysHouseMOO numbering about 30, with median age about 22.5. Most of them are accustomed to mudding while they work at school or computer jobs; this practice leads to periods of idleness and intermittent activity.

In the conversation of a MOO (and many other social MUDs), there are two primary modalities: the "say" and the "emote." "Says" produce quoted output preceded by attibution to the utterance's author. In the examples below, > is my prompt in the MOO window:

```
>"hi there
lynn says, "hi there"
```

"Emotes" produce third person sentences, and are often used to simulate actions or present propositional attitudes or background history in a conversation.

```
>:waves
lynn waves
>:was up till 4am last night
lynn was up till 4am last night
```

Another common use for the emote is to narrate activity in "real life" either to explain periods of idleness or to start conversations in quiet moments (see Cherny 1995 for a review of uses of emotes). In this example, ls packs his computers for his trip.

```
1 ls starts packing for his argonne trip.
  ...
2 ls pulls out his second duo.
3 lynn says, "you have two?"
4 paul [to ls]: show-off
5 ls says, "uh, yeah."
```

Conversation may also take place "long-distance" between characters who are not in the same room. Analogs of the "say" and emote commands are available for long-distance communication. If paul is in another room, I can page him (line 1) or "remote-emote" (line 4).

```
1 >page paul how's it going?
2 Your message has been sent to paul.
3 paul pages, "not bad, you?''
4 >+paul grins.
5 (to paul) lynn grins.
6 (from the sunroom) paul grins too.
```

[1] All names have been changed to protect the community's privacy.

No one but me sees his answering page in line 3, and likewise with his remote-emote response to me (showing which room he occupies) in line 6.

The term "page conversation" generally refers to a private conversation with both pages and remote-emotes occurring in it. Page conversations often occur when a user has a quick topic to discuss with someone who is in another room and neither wants to leave their current party to join the other. Since page conversations are private, and not detectable by other users, they may be used for private topics of discussion as well; even the fact of an interaction between two characters may be hidden if the page modality is used, since the two characters never need be in the same room together to converse. (Private conversations can obviously occur "out loud" between two characters in a room alone together, but since other users can list who is in what room, their activity may be noted and provide a source for comment or speculation.)

The various options for communication of relevance in this paper are summarized in the table below.

Command Name	Private?	Used For...
Say	No	Public conversation
Emote	No	Public conversation
Page	Yes	Across room boundaries
Remote-emote	Yes	Across room boundaries

Back Channels

(Gumperz 1982) reports that back channels represent "one common way in which conversational cooperation is communicated and monitored," and may include nods or other body movements, or interjections like "ok," "aha," "right." I hypothesize that back channels, which include the class of "confirmation feedback" discussed in (Oviatt & Cohen 1988), are important for determining the attention state of an interlocutor, as well as establishing whether speaker intentions have been understood. In a text-based medium where no physical cues are available, and interlocutors may be called away from their desk or terminal at any moment, these are particularly important; back channel emotes and utterances play a large role in establishing achievement of mutual understanding and facilitating a sense of co-presence.

Examples of back channel use in a conversation occur in lines 3, 9, and 13 below.

```
<<Example A:>>
1 Tom says, "only in look_self"
2 Karen says, "cool"
3 Karen nods.
4 Karen thot so, but
5 Karen says, "oh"
6 Karen says, "there was another reason"
7 Karen sigsh
8 Karen wanted name ^j----^j desc
9 Tom says, "huh"
10 Karen
```

```
11 -----      --Karen
12 Karen's description
13 Tom nods.
14 Karen says, "now i can't"
```

In this example, Karen is trying to describe how she wants some text to be laid out: lines 10-12 are her attempt to graphically represent the fields she wants, which consist of a name, a line of hyphens, and a description underneath it. (In line 11, her name was appended by the MOO server to the line with hyphens to indicate that she was the author of that "utterance.")

Conventional expressions of puzzlement, as in line 10, are examples of "other-initiated repair" as discussed in (Schegloff 1982). Schegloff suggests they occur at the same points in conversational interaction that back channel utterances might occur, so I class them together with the other utterances I consider here (although Schegloff's analysis is quite different ultimately). Longer, less conventionalized examples of repair initiation are not included, however (see Example E). Assessments like laughter, or the textual expression of it, are also considered to be in the super-category of back channels for purposes of this paper, for the same reason that short other-initiated repairs are. (Schegloff 1982) notes that back channels tend to be non-lexical items like "mmm hmmm"; however, the class of back channels in MUD discourse apparently includes both descriptions of behavior (`Tom laughs`) and, in some cases, non-lexical imitations of that behavior (`Tom hehs`).

Explicit back channels are used with great frequency among the RaysHouseMOO population and are highly conventionalized. Some of the more frequently used utterances have been encoded in easy-to-type commands that both document and encourage their common use. In particular, the "Carpal Tunnel Syndrome" command set is regularly used on RaysHouseMOO and contains several of the regularly used back channels. For instance, if I type the **nd** command from the CTS command set, everyone in the room with me sees the output "lynn nods," which often indicates that I am attending or understanding what has been said to me. Other utterances in common use on the CTS command set include: `gg` which outputs `lynn giggles` (if typed by me), `h` for `lynn hehs` (simulation of laughter), `gr` for `lynn grins`, `sm` for `lynn smiles`, `/` for `lynn ?` (which approximates a questioning look, according to users' interpretations). The CTS commands set was originally created by two users about a year ago, but is now used by approximately one third of the regular population; the remainder use emotes directly, e.g., by typing `:nods` at the prompt.

Analysis

Typing by human agents contains many idiosyncratic errors and innovations, which would make parsing of much MUD conversation difficult, but the presence of ritual programmed output utterances like the CTS command output makes it easier to automate certain analyses. To investigate the distribution of back channels in my data files, I wrote a set of perl scripts to categorize each person's utterance as either a say, an emote, a page, or a remote-emote. (Other types of utterance, like the thought bubbles in Example B, were not counted.) The length of each utterance was recorded, and the rate of speech was derived from time stamps on the log file. I did pattern matching for the back channels "nods," "hsm," "hmm," "hrm," "oh," "oic" (shorthand for "oh, I see"), "ok," "ah," "yeah," "yes," "?," "giggles," "laughs," "grins," "smiles," and "hehs," which are all conventional forms used in the MUD. Some of these may occur as either emotes or "says," e.g., `Tom hmm` or `Tom says, ''hmm.''`

The bar chart in Figure 1 shows the proportions of back channel emotes to other emotes and emoted "says" to other "says" in four conversations. The non-back channel emotes in these conversations were generally of the background exposition sort, e.g., `Shelley dunno, thinks it's a lot of games.` A few were also narrations of real life activities going on around the mudders: `Ray hears:"and it's a dance club so it won't ALL be mosh music for crying out loud!"` The number of emoted back channels is nearly equivalent to the number of other emotes in several cases. The proportion of emoted back channels to said back channels differs in different conversations; compare, for example, Tom on July 13, with roughly even numbers of said and emoted back channels, versus Tom on January 14, with very few emoted back channels.

In Figure 2, I plotted the course of two sides of one long conversation within a room on June 20, 1994. The left axis measures the number of utterances in each time period (since the last one) as indicated with the solid line, and the rate of speech, as calculated by words/utterances in the period, indicated by the dotted line. When a speaker is relatively inactive in conversation, there is a low utterance count (see time 43). A higher words/utts rate indicates longer utterances are being produced (see time 10 on **lynn talking to Tom**). Time increments are about 11 minutes. The star symbols show number of back channels received from the interlocutor during each time period, measured along the right axis. The graph of **lynn talking to Tom** has Tom's back channels plotted over it, in other words.

In their analysis of task-oriented conversation, (Grosz & Sidner 1986) found that clue words like "ok" and "yeah" showed comprehension of a speaker's goals had been achieved; (Schegloff 1982) shows that back channels are often "continuers," abdications of a full turn from a hearer, which essentially give permission to a speaker to continue developing a complex discourse structure like a narrative. If back channels were only functioning as an indicator of comprehension of a speaker's plans or response to the develop-

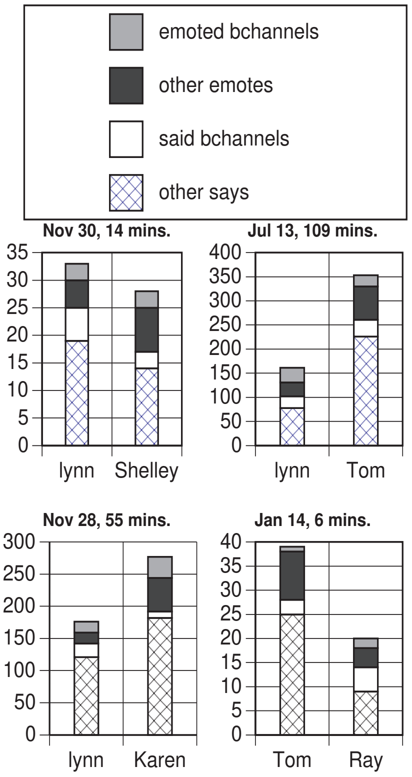

Figure 1: Ratios of Says to Back Channels and Other Emotes in Two-Party Conversations

ment of an extended discourse structure, there should be fewer back channels during periods with little interaction. However, periods with low utterance counts for both conversants (43 minutes, 78 minutes) nevertheless show the presence of several back channels from the interlocutors. The appearance of these signals in such periods probably indicates that a potential interlocutor is attending and may be available for more extended conversation. The conversants are in a "continual state of incipient conversation" (Schegloff & Sacks 1974), analogous to that achieved by the two-party situations (Goffman 1963) describes: "communication arrangements that seem to lie halfway between mere copresence and full-scale co-participation." I provide several examples of this state below.

In the following excerpt from the period around the 43 minute mark, the conversation has moved off the previous topic which was a somewhat tense one, and the interlocutors are registering their continued alertness, even while they document their actions in real life. In lines 1-2, I illustrate that I am reading email in another window, and paste a section from one message. After a desultory exchange on that topic, including a back channel at line 8 indicating comprehension, Tom begins playing with names in thought bubbles (lines 9-11) and then reports singing, a common practice while listening to music and mudding at the same time. I re-

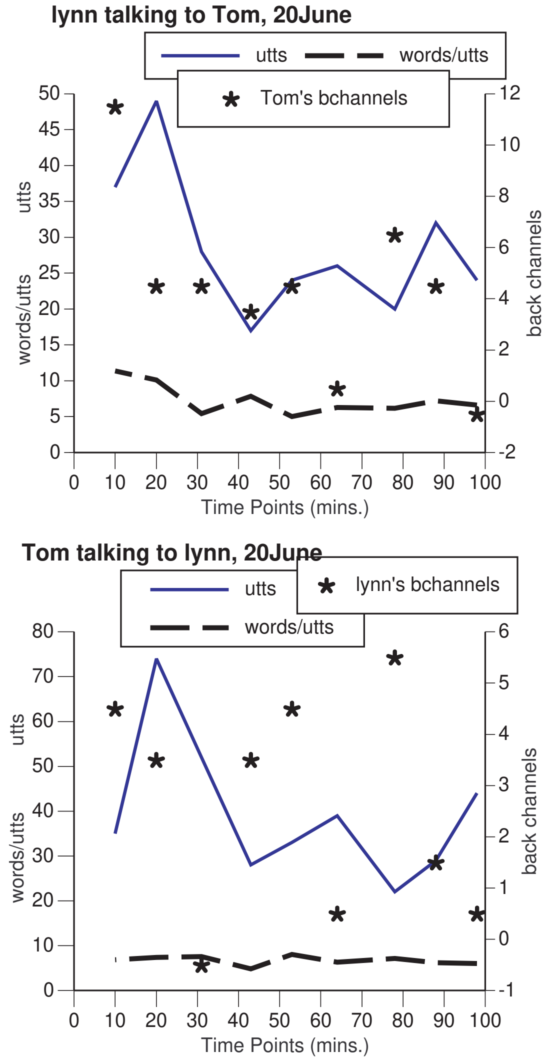

Figure 2: Conversation Rate with Back Channels Overlaid

spond with back channel responses in lines 15 and 18, initially indicating I am still alert, and then acknowledging receipt of information, before making another desultory conversational offer in line 20.

```
<<Example B:>>
1 lynn sees OJ all over the popcult list,
  of course.
2--------------------------------lynn-------
In any case, thanks to OJ, Al, and the LA
chopper teams and reporters for providing
all of us cult studs folx with yet another a
perfect Baudrillardian moment...
----------------------- lynn stops pasting--
Done @pasting.
3 Tom says, "al?"
4 >:dunno.
5 lynn dunno.
```

```
6 >"media coverage somehow.
7 lynn says, "media coverage somehow.''
8 Tom says, "ah"
9 Tom . o O ( oj et al )
10 Tom . o O ( woj simpson )
11 Tom . o O ( homer j simpson )
12 Tom [sings]: who throwed lye on my dog?
13 Tom wonders if he could fall asleep.
14 >"hmm. go home and sleep.
15 lynn says, "hmm. go home and sleep.''
16 Tom is home.
17 >"oh.
18 lynn says, "oh."
19 >"I wonder why I keep dreaming about
  food.
20 lynn says, "I wonder why I keep dreaming
  about food."
```

Line 15's back channel "hmm" is uttered as part of a larger turn. (Schegloff 1982) points out that back channels were initially not considered turns in their own right; he illustrates that they often occur at possible turn completion points during a speaker's pursuit of a complex discourse structure like a list or narrative, and usually don't consist of semantic material other than the conventional non-lexical item that performs the back channel. However, this observation is problematic in MUD discourse, where any utterance or emote probably constitutes a turn (arguably including back channels that appear on their own), and "possible turn positions" are difficult to identify when paralinguistic information is missing. As shown in Example B, a back channel may be part of a larger turn, possibly because the turn structure is challenged by the medium, or because typing takes effort and compression of turns is helpful.

Example C occurred in the minute following Example B; a narrative emote (shown in line 5) described an event on LambdaMOO (happening in another buffer), followed by a back channel response and a small conversational exchange. Note the two turns (or one split turn?) from Tom in lines 6-7 of Example C, consisting of a "hmm" plus another utterance on a new line. (Some speakers appear to break their utterances at prosodic boundaries of different sorts, often subsententially. Less interactive speech is less broken up, generally.)

```
<<Example C:>>
1 Tom [sings]: i live
2 Tom [sings]: where it's
3 Tom [sings]: graaaaaayyye
4 >:gets another random guest 'hi' on lm.
5 lynn gets another random guest 'hi' on lm.
6 Tom says, "hm"
7 Tom says, "do you answer these?"
8 >"the other day I did, but I am not today.
9 lynn says, "the other day I did, but I am
  not today."
```

As the above examples illustrate, back channels do not solely occur in focused stretches of complexly structured speech. Fairly meandering conversation, in which a speaker is not attempting to maintain the floor in pursuit of a complex discourse structure, still shows the presence of back channels, suggesting they are functioning largely as a display of hearer attentiveness during semi-idle periods. They help maintain the "continual state of incipient conversation," so that a potential interlocutor doesn't have to ask "are you still there?" before speaking with greater length and focus.

However, it bears mentioning that back channels do accompany more focused discourse production too. Notice that Karen and Tom produce them at the same points in Example D: in lines 4-5, after a point has been made, and then again at lines 14-15, after an expansion on another point. I produce one at line 11, agreeing with or acknowledging Tom's comment in line 9.

```
<<Example D:>>
1 lynn says, "cuts are followable in films,
  but I started wondering about them in the
  context of muds and teleporting"
2 >"without visual links, you lose
  relationship between spaces
3 lynn says, "without visual links, you lose
  relationship between spaces"
4 Karen nods solemnly.
5 Tom says, "hmmmm"
6 >"and it could be done badly in a cd rom
  game too, no doubt
7 lynn says, "and it could be done badly in
  a cd rom game too, no doubt"
8 Karen hears the mop, is so happy
9 Tom found some of the cuts in myst
  confusing.
10 >nd
11 lynn nods.
12 >"but it's still so slooooowwwww even
  with them
13 lynn says, "but it's still so
  slooooowwwww even with them"
14 Tom nods.
15 Karen nods.
```

As noted in the conversation analysis literature, different back channel utterances may perform slightly different functions in different contexts. Jefferson (1981) suggests that "mm hmm" is a passive recipient token, while "yeah" implies its producer may soon take the floor. The "hmm" utterance or emote (and variants "hsm," "hms," and "hm") in the MOO is not equivalent to the "mm hmm" utterance; it probably functions similar to "hmm" in some "real life" conversation, which represents a sign of thought or discomfort with an interlocutor's previous statements, carrying a suggestion that an explanation of the cause of discomfort or other further comment will be forthcoming. In Examples B and C, "hmm" was accompanied by further comment. In D, while Tom did not respond further immediately after his "hmm," he was the next speaker on the topic. In a non-response situation, "hmm" functions as a sign of internal disquiet:

```
Honda hms, that URL doesn't seem to work..
```

The "nod" may either function passively as a token of understanding or agreement (Example A, D), with no further comment expected; or it may perform as a required turn, indicating "yes." The cases in Example E contrast with the uses of nods in Example D, where they were not necessary responses, but signalled continued attention and/or agreement. (Note that in "real life" conversation, a nod without a vocal acknowledgement in this situation would be rude at best).

```
<<Example E:>>
Ray says, "incidentally, nv works multicast
  on linux"
Ray tested last night
[at 5:38 P.M.]:
Honda [to Ray]: That's video stuff?
Ray nods
Honda [to Ray]: Ron Frederick's package?
Ray nods
Honda [to Ray]: Cool ..
[at 5:39 P.M.]:
```

The distribution of back channels during periods of mutual rapid, dense conversation suggests that some of their functions in periods with less conversation (marking attention, showing understanding or confusion, providing assessment like laughter) are being taken over by other types of utterances. The number of back channels given by speaker A to an interlocutor B generally increases when B's number of utterances increases, but often stays low if instead A's utterance rate increases in parallel (see time 21 minutes and 63 minutes on Figure 2). If A's rate increases too, A is not being a passive listener, but is involved actively in the conversation as well, which may result in fewer back channels. In Example F, from around the 60 minutes mark in **Tom and lynn, 20June**, the confusions are cleared up with explicit questions, rather than conventionalized shorthand utterances like the single question mark or "huh." (The "ow ow ow" utterance in line 7 means that it's harder to type comfortably at home.)

```
<<Example F:>>
1 Tom thinks about when he'd wake up if he
  went to sleep now, and whether it'd be
  safe to bike.
2 >"bike where?
3 lynn says, "bike where?"
4 Tom says, "work"
5 >"how hard is it to work from home?
6 lynn says, "how hard is it to work from
  home?"
7 Tom says, "ow ow ow"
8 Tom says, "plus, i can't do any
  interesting jupiter stuff"
```

Page Conversations

A statistical comparison of the ratio of back channels to utterances in several conversations between myself and one other person revealed that back channels are significantly absent from "long-distance" page conversations (T-test, 7 page, 10 non-page, $p < .05$). (As a participant-observer in the MUD community, I have no access to private page conversations aside from my own, so my inclusion in the logs was inevitable at this point. Asking MUDders for logs of naturally occurring private page conversation might jeopardize my role in the community.)

This finding is non-intuitive at first glance, because remote-emoted commands are available in long-distance conversation mode. However, a closer look at the two types of conversation suggests some reasons for this. The duration of same-room conversations is often longer (although this is hard to establish statistically, since a minimal conversation in either case may consist of only one exchange) and the topic changes over time, whereas page conversations usually cover only one or two topics; often a pager will join her interlocutor and then conversation will continue within the same room. One conversational partner in my logs claims to feel more co-presence in non-paged conversation. The tendency to use back channels more probably contributes to this feeling. The shortcut commands in the CTS set will not work in remote-emotes or pages, which provides another reason for pagers to join one another instead of having extended page conversations.

Interestingly, my page conversations often appear to end on back channels, perhaps because the low content utterances aren't enough to maintain a back-and-forth when there is no potential context for further exchange, as a room provides. Narrative emotes often occur between people sharing rooms during periods of idleness, as a way of reinitiating conversation. These emotes are generally lacking in page conversations. People in page situations do not "idle together," apparently: they lose contact when one or both becomes idle. An example of an entire page conversation, ending on a back channel, is shown in Example G:

```
<<Example G:>>
Penfold pages, "hi."
Penfold pages, "how'd the paper go?"
>page penfold uh, still in final state
  of preparation
Your message has been sent to Penfold.
>page penfold i need to fedex it today
Your message has been sent to Penfold.
(from under the footbridge) Penfold nods
```

Conclusion

Back channels are relatively contentless semantically, but interpreted within their proper context, they can be indicators of attention and/or the comprehension of plans, among other things; understanding their distribution even at a gross level may facilitate automatic recognition of the structure of conversation.

In this paper I suggested that the general distribution of back channels in several MUD conversations shows that they are used for maintaining a sense of co-presence and awareness in a conversation, not just for signalling comprehension, assessment, or recognition that a complex discourse structure is under construction. Although each back channel response may perform slightly different functions, as a class they share some characteristics: they are conventional, often non-lexical, responses used by the community in similar places in the conversational interaction. Some of them describe non-linguistic actions like nods or laughter. MUD conversation does not map well onto turn-taking models of face-to-face conversation, since turn boundaries are problematic to define, so MUD back channel placement is not easily described in terms of possible turn exchange points. However, their overall distribution suggests that they increase when an interlocutor's rate of speech increases, unless both speakers become very active in parallel. Otherwise, their occurrence in periods with relatively low utterance rates suggests they help maintain a sense of continued conversational context and co-presence even when topical conversation is lacking.

Finally, back channels appear to be significantly missing from page conversations, suggesting that page conversation is used very differently from room conversation in the MUD. Social response to the virtual geography of the MUD leads to different behavior over different communication modalities. The virtual equivalent of face-to-face conversation appears to happen in a room, while the "long distance" aspects of page conversations are reified in the interactions that take place in that modality, in which less of a sense of co-presence is projected. However, the data for this conclusion were taken only from conversations I was involved in, so the results are merely tentative.

Studies like this have implications for the development of collaborative tools and for the development of applications like automated conversational agents in communication environments like MUDs. Awareness of the complex behavior of social actors in context, and how their communicative options are recognized and chosen according to situation, will pay off in building applications for environments in which patterns of use have already evolved. Finally, since mediated communication is an increasingly common tool in the work place, identification of the important facets of comfortable conversation is crucial to designers of future networked work spaces.

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