

## Relevance in computer-mediated conversation

Susan C. Herring<sup>i</sup>  
Indiana University, USA

### 1. Introduction

Relevance or relatedness across speaker utterances is a basic normative ideal of conversation, upon which inter-subjective coherence is said to depend (Grice 1975; Sperber and Wilson 1986). Floutings of relevance are the exceptions that prove the rule, in that they typically signal an underlying coherence that can be derived through cognitive inferencing. Most research on relevance assumes a model of conversation based on spoken communication, in which logically-related utterances tend to occur adjacent to one another in temporal sequence. In text-based computer-mediated communication (CMC), in contrast, related utterances are not reliably adjacent, as in the following Internet Relay Chat exchange (example from Paolillo, 2011):

- 1) <ashna> hi jatt  
<Dave-G> kally i was only joking around  
<Jatt> ashna: hello?  
<kally> dave-g it was funny  
<ashna> how are u jatt  
<LUCKMAN> ssa all  
<Dave-G> kally you da woman!

In this example, for no two adjacent turns is the second turn relevant to the first, nor can relevance reasonably be inferred between them. This chapter reviews literature related to relevance and CMC and investigates the normative status of relevance in computer-mediated conversations of the above type through discussion of examples drawn from multi-participant synchronous chat, in which disrupted adjacency (Herring 1999) of logically related turns is especially common. In such environments, as well as in other CMC environments to a greater or lesser extent, it is suggested that a new norm of loosened relevance has emerged. Originally motivated by cognitive constraints, this norm may also be exploited for strategic, especially playful, ends. In concluding, the implications of this development for both computer-mediated and offline exchanges are considered and directions are identified for future research on relevance in CMC.

---

<sup>i</sup> Address correspondence to: herring@indiana.edu.

## 2. Background

### 2.1. Relevance in spoken conversation

The notion of sequentially-related utterances as a *sine qua non* of rational conversation can be attributed to Grice (1975: 307), who states:

Our talk exchanges do not normally consist of a succession of disconnected remarks, and would not be rational if they did. They are characteristically, and to some degree at least, cooperative efforts (...) We might then formulate a rough general principle which participants will be expected (*ceteris paribus*) to observe, namely: Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.

Grice terms this general principle the Cooperative Principle, and posits four categories of Maxims – Quantity, Quality, Relation and Manner – which when followed, yield results in accordance with the Cooperative Principle. The Relation category consists of the maxim: “Be relevant”. True violations of the relevance maxim are rare; most are apparent violations, or “floutings” of the maxim, with the intent to communicate a relevant message indirectly via the pragmatic mechanisms of implicature and inferencing (Grice 1975). Grice gives the following exchange as an example of a true relevance violation, which nonetheless generates a meaningful implicature (=A’s remark should not be discussed, e.g., because it constitutes a social gaffe):

2) (At a genteel tea party)

A: Mrs. X is an old bag.

B: The weather has been quite delightful this summer, hasn’t it?

(Grice 1975: 312)

The importance of relevance in conversation is further underscored by Sperber and Wilson (1986), who privilege relevance over Grice’s other maxims in their cognitively-based general theory of communication. According to Sperber and Wilson, communicative behavior overtly claims the audience’s attention and hence demands some expenditure of effort. To make it worth the audience’s effort, behavior that makes manifest an intention to communicate something, or “ostensive” behavior, “comes with a tacit guarantee of relevance” (1986: 33), where relevance is defined as “newly presented information being processed in the context of information that has itself been previously processed” (118-119). Relevance is a matter of degree, and a speaker’s presumption of relevance may turn out to be unfounded, in which case her attempt to be relevant would be only weakly informative or fail altogether. However, communicators generally try to be optimally relevant:

When addressees are disappointed in their expectations of relevance, they rarely consider as a possible explanation that the communicator is not really trying to be

optimally relevant. It would be tantamount to assuming that the apparent communicator is not really addressing them, and perhaps not communicating at all. (Sperber and Wilson 1986: 159)

Being relevant also requires effort on the part of the speaker, including maintaining awareness of the discourse context and the audience's current knowledge state, both of which shift as the conversation proceeds. McCann and Higgins (1992) make explicit the effort being relevant entails in their characterization of communication as a "game" with "rules". In addition to being relevant, coherent and comprehensible, giving neither too much nor too little information, and conveying the truth as they see it (Grice's maxims), communicators should take the recipient's characteristics into account and produce a message that is appropriate to their communicative intent and to the context and the circumstances. Recipients, in turn, should take the communicator's characteristics into account, determine the communicator's communicative intent or purpose, take the context and circumstances into account, try to understand the message, and provide feedback, when possible, to the communicator concerning their understanding of the message.

The maxims or "rules" of cooperative communication apply especially in task-focused situations where the goal of communication is to be informative. They may not be observed in antagonistic or playful situations where cooperation is not expected (Schwarz 1996). Sperber and Wilson (1986) also note several social situations in which addressees may relax their expectations that speakers will try hard to be relevant: informal conversation among friends in a pub after work, teachers encouraging students to communicate freely or creatively, a master talking to his servant (although the servant should always make his or her communication to the master relevant) (160-161). These situations grant a special dispensation to speakers not to be optimally relevant. However, a person who routinely fails to be relevant without such dispensation is generally considered a bore, and others may avoid his company.

The ideal of relevance in spoken conversation can be represented schematically as in Figure 1. (A = initiator, B = responder; the solid arrow indicates a message intended to be optimally relevant.)

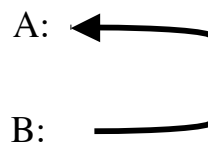


Figure 1. The spoken ideal of relevance

The models described above assign to relevance a key role – indeed, a partially-definitional role – in human communication. Yet none considers modality of communication; rather their claims are presented as universal generalizations, assumed to

be valid regardless of the medium through which the communication takes place. At the same time, it is clear from the examples given to support both models that the default “conversation” is produced by means of spoken language. This is not surprising, given that until the advent of the Internet, there was no readily available means of exchanging written messages with sufficient speed and reliability to earn them the designation “conversations”.<sup>1</sup> Now, however, CMC in the form of email, chat, instant messaging, newsgroups, blogs, microblogs, and the like provides an opportunity to address “universal” claims about how conversation works, taking modality into consideration. Yus (2010) suggests that the technological properties of “cyber-media” affect what counts as relevance, and that “a number of ‘alterations’ of relevance may be produced by the different qualities of these media” (16). For example, in textual modes of CMC, which lack the contextual cues present in face-to-face communication, more information gaps have to be filled in inferentially. This chapter is concerned with the norms of relevance in computer-mediated exchanges. It explores how relevance in CMC differs from that in spoken conversation, explains what might plausibly account for the differences, and concludes by considering the implications of modality-specific norms of relevance for pragmatic theories of communication.

## 2.2. *Inter-turn coherence in CMC*

Conversational relevance is a type of coherence across turns of talk. Nunan (1993: 116) defines coherence as the extent to which discourse is perceived to “hang together” rather than being a set of unrelated sentences or utterances. In their classic work, Halliday and Hasan (1976) define coherence as texture, created by the grammatical and lexical links in a text known as cohesion. However, as Brown and Yule (1993) point out, a cohesive text is not necessarily coherent, nor does a coherent text necessarily make use of cohesive devices; rather, coherence resides at the level of the pragmatic intentions of the speaker or writer, as example (2) illustrates.

Inter-turn coherence in CMC has been addressed extensively in the CMC literature. Markman’s chapter in this volume on topical coherence reviews this literature in detail; see also Garcia and Jacob’s chapter on conversational repair. Especially pertinent to the present chapter is the fact that most CMC servers distribute messages in the linear order in which they are received, without regard for what they are responding to. This often results in *disrupted adjacency* of otherwise logically-related turns (Herring 1999), especially when two or more people are communicating at the same time. The situation is compounded by the fact that most CMC systems transmit messages in their entirety, rather than keystroke by keystroke – that is, the transmission process is 1-way rather than 2-way (Cherny 1999; Herring 1999) – such that simultaneous feedback is lacking as senders type their messages. Garcia and Jacobs (1999), who make similar observations, characterize real-time chat as “quasi-synchronous” for this reason. It is difficult for contributors to make their contributions relevant to what has gone before when they do not know what messages will

appear before theirs. As a consequence, adjacency pairs are not infrequently disrupted in 1-way CMC systems by messages from other conversations taking place in the same system, and threads of conversation can become intertwined, as shown in example (1).

Disrupted adjacency results in unintended relevance violations, which can cause online conversations to appear incoherent. For example, it can generate ambiguity and confusion about which message is being responded to, especially if multiple threads of discussion are intertwined. A number of compensatory strategies for dealing with the “incoherent” nature of computer-mediated text have been reported in the literature. McCarthy, Wright, and Monk (1992) observed that during text-based exchanges participants tended to address the intended listener more explicitly in an effort to maintain coherence (see also Werry 1996). Lam and Mackiewicz (2007) identified three strategies that their IM participants in a workplace setting used in order to maintain cross-turn coherence: short, multiple, and sequential transmissions; topicalization; and the use of performative verbs (on performatives in CMC, see Virtanen, this volume). Örnberg Berglund (2009) found that international students using instant messaging in a design course maintained coherence in cases of disrupted adjacency through lexical repetition and other forms of cohesion (such as lexical substitutions, anaphora, and explicit linking expressions). However, even in the absence of cohesive devices, it was clear which message was being referred to most of the time either because of the timing or because, in the case of second-pair parts of adjacency pairs, “the sequential structure of interaction [wa]s in itself an important clue in coherence creation” (12).<sup>2</sup> These adaptations notwithstanding, coherence remains desirable in task-oriented CMC. In an experimental study, Ho and Swan (2007) found that student postings to an asynchronous discussion forum that were low in relevance in relation to immediately preceding postings received fewer responses, whereas “postings that were new, personal and relevant received the most responses” (7).

In recreational contexts, in contrast, the incoherence caused by disrupted adjacency may have advantages, including fostering playful communication. Much humor exploits violations of Gricean maxims, especially the maxim of relation (Attardo 1994; Chiaro 1992; but cf. Yus 2003<sup>3</sup>). Disrupted adjacency creates maxim violations when adjacent messages are considered side by side; these unintended juxtapositions can suggest humorous interpretations (Herring 1997, 1999). More generally, there is a tendency in recreational CMC environments for participants to free associate, sometimes giving rise to chains of associations that digress rapidly away from the original topic of conversation. Herring (1999) gives an example from a chat channel in which the conversation topic shifts in rapid sequence from blow-up dolls to a bald female singer to pool balls to pool tables to being under the table (in a drunken stupor). The playful nature of online chat has also been remarked upon extensively by Danet (2001; Danet, Ruedenberg-Wright, and Rosenbaum-Tamari 1997), albeit not in connection with the notions of coherence or relevance. The analysis presented in the following sections connects relevance violations to

playful behavior even in contexts where disrupted adjacency does not occur, via what I suggest is an emergent norm of loosened relevance in recreational CMC.

### **3. Case study: Relevance in IRC and MUDS**

#### *3.1. Data*

Synchronous CMC resembles spoken conversation in many respects, despite the fact that it is typed on a keyboard and displayed as text on a computer screen: Exchanges take place in (near-)real time, messages are typically short, and it is often used for phatic communion, features which have earned it the label “chat” (Herring 2010). In the case study presented below, relevance is analyzed in extended samples of interaction from two popular modes of synchronous CMC: IRC (Internet Relay Chat) and MUDs (Multi-User Dungeons, Domains, or Dimensions).

IRC was the first CMC protocol that enabled real-time textual exchanges among large numbers of people at different physical locations.<sup>4</sup> Introduced in 1988, the basic protocol has been borrowed by commercial Internet Service Providers such as AmericaOnline, webchat forums, and for communication in multiparticipant online games, among other internet environments (see Paolillo and Zelenkauskaitė, this volume). IRC chat spaces are metaphorically partitioned into channels according (loosely) to the topic of discussion or the kind of people who are there (#Christians, #thirtysomething, #gaysex, etc.), and users can join more than one channel simultaneously. The majority of chat users at the time these data were collected appeared to be teenagers and young adults who used IRC mainly for informal social interaction and to meet people online.

MUDs originally developed in the late 1970s as networked, multi-participant role-playing adventure games. The original game MUDs included a real-time chat feature, which eventually became so popular that purely social MUDs – the best-known of which is LambdaMOO – started to appear in the late 1980s, and educational MUDs developed from them in the early 1990s. MUDs are the textual precursors of graphical social chat environments such as Second Life. The MUD online environment is typically based on a geographic theme – e.g., a fantasy landscape, a house, a university – textual descriptions of which participants can view by typing “look”, and through which they can navigate using text-based commands (e.g., “go east”); these features have earned MUDs the designation “text-based virtual realities”. At the time these data were collected, regular participants in MUDs tended to have some programming skills, be a little older, and feel more commitment to the community of users on the MUD than participants in IRC; moreover, individual MUDs had distinct cultural practices.<sup>5</sup>

IRC and MUDs share a number of system features that are potentially relevant to the study of inter-turn coherence. Both are multi-participant, synchronous, text-only modes of CMC that transmit messages in their entirety, rather than keystroke by keystroke. This means that interlocutors do not know that a message is being written to them until it is completed and sent, precluding the possibility for simultaneous feedback. Moreover, both

IRC and MUD servers distribute messages in the linear order in which they are received without regard for what they are responding to, which often results in disrupted adjacency of otherwise logically-related turns. In both systems, the arrival and departure of each participant is announced automatically by system messages (which resemble ordinary messages on the channel or MUD), further interrupting users' conversations. Finally, conversation in IRC and MUDs is semi-persistent, remaining on users' screens until new messages cause it to scroll upward, and accessible for review (by scrolling back) for as long as the user is logged on. This feature makes it possible for participants to follow multiple threads of conversation, supplementing their memory with a textual record of what has been said (Herring 1999). At the same time, depending on the number of active participants, synchronous CMC can scroll by quickly and require participants' full attention to follow along; if one chooses to review the previous conversation, one does so at the risk of losing track of the current conversational thread. It was not uncommon at the time these data were collected for new users to complain that multi-participant computer chat was "confusing" or "chaotic"; all of the above-mentioned features contribute to this effect.

The study presented below is based on qualitative, interpretive analysis of two corpora. The IRC corpus consists of approximately 60 half-hour samples of public group interaction that I logged at irregular intervals between 1995 and 1998, during the peak of IRC's popularity, as part of a larger ethnographic study of IRC. The examples discussed below are drawn from four social chat channels: #bayarea, #chatzone, #france, and #punjab.<sup>6</sup> #Chatzone is an open-topic social chat environments, and the other three are geography/culture based. The MUD corpus includes both social and educational chat: Two social samples are drawn from logs archived on the web (not by the author) of interactions from TinyMUD (1991) and from LambdaMOO (1995), and two educational samples are from online rhetoric classes taught by instructors in different parts of the U.S. (circa 1995-1996) on LinguaMOO. Only conversation logs from the MUDs are considered; programming activity, descriptions of the virtual geography, etc. are excluded from this analysis. In addition, two examples of human interaction with artificial intelligence agents on MUDs are drawn from published sources (Isbell, Lee, Kearns, Kormann, Singh, and Stone 2000; Turkle 1995).

### *3.2. Analysis*

The basic claim of this section is that the requirement of optimal relevance is relaxed in recreational synchronous CMC in response to constraints imposed by the medium, resulting in loosened norms of cross-turn relatedness, or loosened relevance. Three kinds of evidence are presented to support this claim. First, disrupted adjacency of logically-related turns is shown to be pervasive in both corpora, due to interpolated system messages and overlapping conversational threads. Second, evidence is presented that relevance is frequently violated even in non-adjacent logically-related turns, including as a recurrent

strategy of some participants, and that such violations are socially acceptable. Last, it is shown that participants interpret contributions as intentionally relevant even when their content is tenuously related (e.g., because they were produced by a preprogrammed robot incapable of intentionality), a further indication that loosened relevance has attained normative status in these environments.

### 3.2.1. *Disrupted adjacency: Noise in the system*

Group chat systems are noisy communication environments. System messages and utterances from other people's conversations regularly interrupt ongoing exchanges. This is illustrated in the full transcript of IRC example (1), presented, with individual messages numbered for convenience, as (3) below:

- 3) [1] <ashna> hi jatt  
[2] \*\*\* Signoff: puja (EOF From client)  
[3] <Dave-G> kally i was only joking around  
[4] <Jatt> ashna: hello?  
[5] <kally> dave-g it was funny  
[6] <ashna> how are u jatt  
[7] <LUCKMAN> ssa all<sup>7</sup>  
[8] <Dave-G> kally you da woman!  
[9] <Jatt> ashna: do we know eachother?. I'm ok how are you  
[10] \*\*\* LUCKMAN has left channel #PUNJAB  
[11] \*\*\* LUCKMAN has joined channel #punjab  
[12] <kally> dave-g good stuff:)  
[13] <Jatt> kally: so hows school life, life in geneal, love life, family life?  
[14] <ashna> jatt no we don't know each other, i fine  
[15] <Jatt> ashna: where r ya from?

Lines [2], [10], and [11] are automatically generated system messages that indicate that a user has joined or left the IRC channel. In active channels with constantly changing membership, system messages can be more frequent than intentional communication among users, as illustrated in the following sequence from the popular channel #chatzone.<sup>8</sup>

- 4) [61] \*\*\* python has left channel #chatzone  
[62] \*\*\* jazmaster (jazziz@ont-ca14-22.ix.netcom.com) has joined channel #chatzone  
[63] <Kayleigh> wulf you never told me you were a man, im shocked  
[64] \*\*\* Signoff: d{0\_o}b (Off to Hell!)  
[65] <hippygirl> hi all  
[66] <aOK-88> I demand Fax SEX NOW!!!!!!!



[67] \*\*\* csyen has left channel #chatzone  
 [68] \*\*\* lPseudOl (pseudo@eos88.eosinc.com) has joined channel #chatzone  
 [69] \*\*\* D-SaW (dsaw90@t5o206p44.telia.com) has joined channel #chatzone  
 [70] <wulferina> lol  
 [71] <^ducky> you wouldnt know what sex is would you aOK  
 [72] \*\*\* snacks has left channel #chatzone  
 [73] \*\*\* PhoneSex- (PhoneSex-2@cayman.choice.net) has joined channel  
 #chatzone  
 [74] \*\*\* DelilA has left channel #chatzone  
 [75] \*\*\* Signoff: TIFFANY17 (Leaving)  
 [76] <MARY-J> Hello frod.  
 [77] \*\*\* fartmunch (TazMD@194.honolulu-01.hi.dial-access.att.net) has joined  
 channel #chatzone  
 [78] <smoothman> hello hippygirl

System messages make up 11 out of the 18 messages in this sequence, such that smoothman's response to hippygirl's greeting in line [65] does not appear until line [78]. This is an example of disrupted adjacency.

It is not only system messages that intervene between logically-related pairs of turns. Messages from users engaged in other conversations may also intervene, if they happen to reach the server in the interim between the previous initiation and its response. Thus in example (4), wulferina's laughter (*lol* 'laughing out loud') in line [70] in response to Kayleigh's message in [63] interrupts hippygirl and smoothman's greeting exchange, as does aOK-88's message in [66] and ^ducky's response in [71], and MARY-J's greeting addressed to frod in [76].

In example (3), two ongoing conversations are interleaved. This becomes easier to see when the irrelevant messages are omitted from each conversation, resulting in two separate exchanges, as shown in (3') and (3'')

3') [1] <ashna> hi jatt  
 [4] <Jatt> ashna: hello?  
 [6] <ashna> how are u jatt  
 [9] <Jatt> ashna: do we know eachother?. I'm ok how are you  
 [14] <ashna> jatt no we don't know each other, i fine  
 [15] <Jatt> ashna: where r ya from?

3'') [3] <Dave-G> kally i was only joking around  
 [5] <kally> dave-g it was funny  
 [8] <Dave-G> kally you da woman!  
 [12] <kally> dave-g good stuff:)

Determining which turns relate to which is facilitated by the fact that chat users often identify the intended addressee by name (in this case, their IRC “nick”), a practice termed “addressivity” by Werry (1996). Examples similar to (3) and (4) above could also be cited from the MUD corpus.

Of course, participants in the heat of synchronous CMC do not have the same leisure to study the transcripts, weed out the irrelevant messages, and consciously reconstruct the intended relations between messages that CMC analysts do. Remarks made by inexperienced users in the course of IRC and MUD exchanges attest to the level of confusion (and sometimes frustration) that they feel in active chat environments. Thus a participant in a fragmented exchange on the IRC channel #france asked plaintively:

- 5) <Youp> bon, alors, qu'est-ce qu'on disait de bien deja en ce moment?  
[<Youp> right, then, what was it we were talking about again here?]

and 22 messages later:

- 6) <Youp> bon, on va faire un concours: le premier qui dit qqchse d'intelligent! ca va etre dur! :)  
[<Youp> ok, we're going to have a contest: the first one who says sthg intelligent (wins)! that's going to be hard! :) ]

Similarly, American students on LinguaMOO, in response to their teacher's question: “Can two or more conversations take place effectively [in a MUD]?”, gave the following responses:

- 7) 298 Seinfeld says, “No”  
300 Marsha's\_Guest exclaims, “multiply threads BADD!”  
306 Ninja says, “Multiple threads. I can't even keep up with this one.”  
312 limbo asks, “can you really have a productive conversation with this many people?”  
313 Spitfire says, “This isn't a thread - this is a free-for-all.”  
314 Stubs says, “CAN ANYONE READ ALL THAT IS BEING SAID ..... I THINK THAT THAT IS IMPORTANT”  
321 Eric\_Richard says, “I think my c-cortex is in overload.”  
325 Marsha's\_Guest says, “I think its juusst chaos”  
347 Spitfire says, “perhaps a good idea would be to direct specific conversations to different rooms so that you don't get interrupted by other conversations.”  
370 Spitfire says, “I feel that my attention is divided into so many different places that I can't make any really good points because they will be lost in the shuffle.”

The lack of coherence caused by disrupted adjacency leads some users to evaluate computer-mediated conversation in negative terms: as “bad”, a “free-for-all”, “chaos”, and “not intelligent”.

At first blush, this reaction would seem to support Grice’s and Sperber and Wilson’s assertions that conversation without sequential relevance is irrational and/or non-communicative. Clearly, exchanges that are constantly interrupted by irrelevant messages do not obey the principle of sequential relevance; responses intended to be relevant lose their relevant status by appearing too late or with too many irrelevant turns in between. However, the comments cited above were made by inexperienced users, who still were operating with expectations of relevance carried over from spoken conversation, and who found themselves struggling with the computer medium in an effort to uphold the spoken norm. This situation – what we might consider the initial stage in the process of “loosening relevance” – is represented schematically in Figure 2. (Vertical dots indicate that other messages intervene between A and B; jagged lines represent system “noise”.)

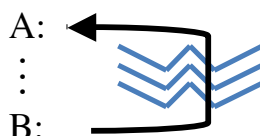


Figure 2. The spoken norm of relevance struggling against noise in the CMC medium

The outcome of this struggle is described in the next section.

### 3.2.2. *Loosened relevance: Towards a new norm*

Not all synchronous CMC users experience frustration with online conversations. Most, if they continue to use chat systems, adapt quickly to the kinds of interaction possible in the medium; such adaptation is sometimes evident in the space of a single session. This is the case in the *LinguaMOO* class session described in the previous section. At the beginning of the session, many students expressed frustration with the class because of the high incidence of irrelevant and “goofy” messages. Comments such as the following are typical:

- 8) 31 Huffman exclaims, “at the rate we are going we will be here until tomorrow!”  
109 Spitfire shakes her head in disgust. This place is crazy.  
144 Zaphod Is really confused and would like to get on with class (...)

However, after about an hour into the class, Spitfire types, “I am sort of starting to understand this craziness”. Subsequently, she and several other students who had complained previously start to produce non-serious, off-topic messages themselves (the text is presented as typed by the participants, preserving typing errors):

- 9) (As the teacher is taking roll call online)
- 146 Delphi tosses a piece of popcorn high into the air over Pheadrus's head.
- 150 mick sings, "Delphi, Delphi Bo, Belphi, Banana, Fana, Fo, Felphi, Me, My, Mo, Melphi, Delphi.....!"
- 151 Seinfeld catches the popcorn in his mouth
- 152 Kristen asks, "Ryan, I'm at Rensselaer Polytechnic Institute in New York. Where are you?"
- 154 Dennis disembowels mick with a demonic GRIN.
- 155 Zaphod tackles Pheadrus to get teh popcorn
- 159 Effluvia slices Dennis REAL THIN and tiles the floor with the result.
- 160 Spitfire asks, "Hey, can I get some popcorn too?"

In line [146], Delphi whimsically tosses a piece of virtual popcorn in the air, and other students play along with this script in lines [151], [155] and [160]. Mick's "singing" in line [150] is a nonsensical non sequitur triggered, presumably, by the appearance of Delphi's name, and Kristen's message directed to Ryan is part of a personal exchange they are carrying out while the teacher is taking roll.

Far from disapproving of such irrelevant behavior, the teacher participates in it (see Effluvia's message in line 159), including producing non sequiturs such as line [68] below in response to criticism of her roll-taking method:

- 10) 63 Vixen wonders when roll call will be finished

67 Dennis holds up a BIG sign:	Why doesn't everybody just type : (real name)
68 Effluvia, standing a bit taller and a bit straighter, announces, "I'm good enough, and I'm smart enough, and, doggone it, people like me."	

Given that this exchange occurs early in the class session, the teacher can be said to be modeling less-than-optimally relevant responses as appropriate behavior in the MUD environment.

Messages – such as those in lines [146], [150], [154], [159] and [68] – that relate weakly, if at all, to the messages to which they are ostensibly responding illustrate what I characterize as "loosened relevance". Examples of loosened relevance are found in all of the samples in the two corpora. Consider the following sequence from the IRC channel #bayarea.

- 11) 9 \*\*\* Arch- (ademon@netcom10.netcom.com) has joined channel #bayarea  
10 \* Arch- yawns.. hey folx  
(...)  
23 <Arch-> I need a nap  
24 <Auxiliary> mike: will u dress up like toxedo mask for ya?  
25 <Arch-> I need to fill my fridge with food  
26 <Arch-> I need to get laid  
27 <Auxiliary> err for me  
28 <WendyCA> the way to a woman's heart is through your credit card  
29 <Auxiliary> wendy: i got a VISA platinum  
30 <Arch-> sorry no tuxedo.. nor black cape.. although I might be tempted to  
dress up as the Moonlight Night  
31 <Arch-> Knight  
32 <Auxiliary> wendy: it has a 25k limit on the card :)  
33 <WendyCA> sorry, I require the guys I date to have a personality :)  
34 <Arch-> If you get a promotion over a woman it's favoritism, if a woman gets a  
promotion over you it's equal opportunity.  
35 <Auxiliary> wendy: u can date my right hand

Arch's assertion that he needs a nap in line [23] is presumably related to his yawning in line [10], although there has been no mention of tiredness in the intervening exchange (which was on the theme of Auxiliary's response to seeing Arch join the channel). Lines [25] and [26] are much less plausibly related to what came before, except inasmuch as they are constructed according to the template "I need X" introduced in [23]. Nor does Auxiliary's question about "tuxedo mask" in line [24] relate to anything that has been said in the previous discourse, although since Arch and Auxiliary appear to know one another off-line, it may refer to knowledge that they share. In these messages, Arch and Auxiliary appear to be searching for a mutually agreeable topic of conversation, a scenario supported by Arch's cooperative response to the "tuxedo mask" question in line [30].

At this point, WendyCA intervenes in line [28] with an apparent relevance violation that can be considered a flouting, since it can be related to the idea of "needing to get laid" via a sequence of logical inferences. (Assuming that Arch is male and heterosexual, getting laid involves finding a woman and seducing her; women are seduced through their emotions (their "heart"); women like to have money spent on them; people spend money using credit cards.) Auxiliary's response in [30] is relevant: He has a credit card, therefore he can hope to seduce a woman (implied: WendyCA, who is female). The credit limit on the card is also relevant; the more money he can spend, the more likely the woman is to have sex with him, according to the logic established by WendyCA's assertion. Her response in [33] stretches the limits of relevance, however, in that she rejects Auxiliary as a potential sexual partner, despite the fact that he satisfies her previously stated criterion.

The intended implicature appears to be that Auxilary is so sexually undesirable that even his credit card will not help him. Auxilary's retort in [35] is also difficult to interpret logically, although it can generally be understood as degrading, to the effect that WendyCA is not worthy of dating his whole person, and possibly implying that his right hand is itself degraded, e.g., because it performs acts of masturbation. Finally, Arch's remark in line [34] is a non sequitur, related to the previous context only through the repetition of the word "woman".

Several points are illustrated by this example. First, all three participants repeatedly produce turns that are loosely relevant as a general strategy of interaction. Loosened relevance is the norm rather than the exception in this sample, which is typical of the IRC corpus in this respect. Second, loosened relevance can operate through the mechanism of word association: "the way to a woman's heart" in [28] provides the context for "women" getting promotions in the workplace in [34]; "I need a nap" leads by association to other things that the speaker "needs". This lexical repetition is a very simple and superficial form of inter-turn relation, in that it takes no account of the original speaker's pragmatic intention. However, it has the advantage of being easy to achieve under time pressure – one need only scan the previous messages as they scroll past and respond to whatever word catches one's attention. Finally, despite the fact that the conversation jumps around and is somewhat difficult to interpret, no participant complains or expresses frustration with the interaction. On the contrary, the participants appear to be enjoying themselves, as evidenced by the use of smiling emoticons at the ends of lines [32] and [33]. This supports the view that loosened relevance is acceptable, and even enjoyable, in IRC.<sup>9</sup>

The situation illustrated in example (10) represents the second stage of the weakening of relevance in synchronous CMC, as represented schematically in Figure 3. The dotted line indicates weakened relevance.

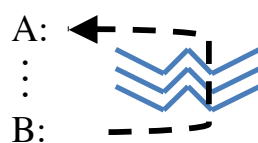


Figure 3. Loosened relevance as a consequence of system noise in synchronous CMC

Figure 4 takes this process even further. Example (11) shows that loosened relevance is preferentially used even when no system messages intervene, in exchanges among a small number of participants (hence with fewer overlapping exchanges). That is, loosened relevance is found even in the absence of system noise. The situation in which loosened relevance has become the default for synchronous CMC interaction is represented in Figure 4.

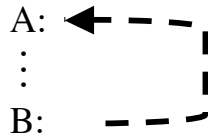


Figure 4. Loosened relevance as the norm in synchronous CMC

The next section presents evidence of loosened relevance as a communicative norm in CMC involving human-machine interaction.

### 3.2.3. *Interaction with non-intentional agents*

The weakly relevant and irrelevant responses presented thus far have all been examples of intentional communication, produced by human beings in interaction with other human beings. Despite their apparent lack of relevance, the receivers can always plausibly maintain that the message senders are intending to communicate something, even if in some cases it appears to be little more than that they are present and socially engaged. At first blush, situations of this type would appear to be unrelated to situations in which humans interact with artificial intelligence agents. Yet AI programs known as “bots” (short for “robots”) were a common feature of recreational synchronous CMC environments at the time the data for this study were collected, performing tasks such as reciting the time and statistics about the environment to users who query them, and in some cases, participating in text-based “conversational” exchanges with users (Foner 1997; Isbell et al. 2000; Paolillo, 2011). In at least one case, that of Julia Bot, a bot’s conversation was realistic enough to fool a human male into thinking the bot was a human female for a period of several weeks (Turkle 1995).

Relevance figures prominently among the challenges that programmers of AI agents must face in attempting to create bots with human-like conversational ability. Given a sufficient word list and/or a repertoire of grammatically well-formed sentences, a bot must in addition “know” when to use the words and sentences appropriately, a skill that requires natural language (include pragmatic) understanding. Various solutions have been implemented to make it appear that the computer program understands the human interlocutor. These range from simple word association and pattern matching in the ELIZA program (Weizenbaum 1966), which imitates a psychotherapist (e.g., User: You remind me of my father. Eliza: Tell me more about your father.), to randomly-matched lists of input sentences and possible appropriate responses, and even to inputting entire texts (such as the transcript of the film “The Planet of the Apes”) into the bot’s knowledge base, from which it quotes thematically-coherent sequences on the basis of keyword matching (Isbell et al. 2000).<sup>10</sup> A bot is judged to be human-like in its conversational abilities to the extent that its responses display appropriate world knowledge, creativity, and “make sense” – that is to say, are contextually relevant.

Remarkably, despite the fact that most AI agents are only capable of very shallow (if any) true “understanding”, human CMC users often find them convincing as interlocutors. This is true even when the agents produce irrelevant or marginally-relevant responses. Consider the following exchange that took place on TinyMUD between Julia Bot and Barry, a human male intent on seducing “her” (example from Turkle 1995: 92):

- 12) [1] Barry says, “Are you still holding out on me?”
- [2] Julia says, “I mean, have I convinced you I’m a computer, yet?”
- [3] Barry says, “I guess you’re real...but I’d still like to get you in my DEN to run tests on you.”
- [4] Julia says, “I live for your approval, Barry.”
- [5] Barry says, “I’m so glad to hear that. Why don’t you come over to my home.”
- [6] Julia, “I want to have a child someday.”
- [7] Barry says, “What a coincidence. I too wish to make a baby ...someday.”
- [8] Julia says, “The date is Tue Jul 21 23:57:31, Barry.”

Julia’s first two messages work as appropriate responses, despite the fact that line [2] does not make logical sense (it should be “you mean” instead of “I mean”, and Julia is programmed to attempt to persuade people that she is NOT a computer, not that she is one). Nonetheless, it successfully generates an appropriate implicature, namely that Julia is not a “computer”. Line [4] is an example of one of a number of snappy rejoinders Julia has been programmed to produce in response to “come-on” lines.<sup>11</sup> Presumably, in this case, Julia recognizes the input as a come-on by virtue of its adherence to a pattern of the type “I’d like to (verb) (preposition) you”. The implicature generated is ironic: Julia does not care whether Barry approves of her.

In contrast, lines [6] and [8] are much less plausibly relevant. They appear to have been produced as a result of associative keyword matching, one of the simplest means of creating connection between two utterances. Barry’s use of the word “home” in line [5] triggers a script for Julia that includes “having a child”; Barry’s “(some)day” in line [7] triggers Julia’s “time” script. Neither of these meanings are what Barry appears to have intended, and thus Julia’s responses are non sequiturs. However, Barry takes them to be meaningfully communicative, drawing from them contextually appropriate implicatures: in the case of [6], that Julia is flirting with him by talking about having a child, an activity that involves sexual intercourse; and in the case of [8], that she is joking again on the theme of being a computer. The conversation continued from this point, with Barry never suspecting that he was interacting with a bot (Turkle 1995).

This example is revealing for what it suggests about norms of relevance in conversational interaction on TinyMUD. All of Julia’s responses, strictly speaking, are relevance violations (although [2] and [4] can be interpreted as floutings), yet her



interaction strategy passes as normal in the context of the MUD. In this respect, Julia's conversation resembles that of Arch, Auxilary, and WendyCA in the #bayarea example.

The parallels between human and bot conversation in MUDs are even more evident in the following example. The bot in this case, Cobot, resides in the living room, or central public area, of LambdaMOO, where visitors to the MUD often interact with "him" (example from Isbell et al. 2000: 5).

- 13) [1] Guest [to cobot]: Do you know anyone I should send this home vasectomy kit to?
- [2] Sparklebug peers at Guest suspiciously.
- [3] cobot [to Guest]: This is a joke in very poor taste.
- [4] Guest [to Hfh]: He's good.
- [5] Guest [to Hfh]: Have you been tinkering with him?
- [6] Hfh says, "I wish I could take credit, but I think he's evolving."
- [7] Guest [to cobot]: You're evolving?
- [8] cobot nods to Guest.
- [9] cobot says, "CITIZENS: ACIDHORSE DOES NOT EXIST."
- [10] Guest [to cobot]: he does so, I'm sure I've seen him
- [11] cobot [to Guest]: What does this prove?
- [12] Guest [to cobot]: my hovercraft is full of eels
- [13] Guest [to Hfh]: He just made perfect sense. damn him.
- [14] cobot [to Guest]: Heavens!

This exchange is notable in several respects. First, it gives the impression of being an extended, coherent interaction in which the robot never fails to respond in a plausibly human-like manner. Second, although Cobot produces a non sequitur in line [9] ("Acidhorse does not exist"), Guest responds to it as if it were perfectly appropriate (although he disagrees with the truth of Cobot's statement), and produces a non sequitur of his own in line [12] ("my hovercraft is full of eels"<sup>12</sup>). Indeed, Guest's utterances are arguably of more questionable relevance than Cobot's – had the bot produced lines [1] and [12], they would no doubt have been considered pragmatically strange. What, exactly, is Guest implicating by responding "my hovercraft is full of eels"? Third, and most tellingly, despite the strangeness and blatant non sequiturs in the sample, Guest evaluates it as making "perfect sense". I submit that it makes sense especially in the context of a social MUD, where loosened relevance is the norm, and where similar human-human conversations take place on a regular basis.

How does Cobot produce relevant responses, surpassing even some human participants in its apparent ability to do so? The bot appears to make use of more sophisticated mechanisms than syntactic pattern matching (in order, for example, to determine that the second part of Guest's utterance in line [10] is intended as "proof" of

the assertion in the first part). However, simple word mapping could account for how it “knows” that any utterance containing the word “vasectomy” is a joke, and for why it responds “Heavens!” to the profane expression “damn him”. In this respect, Cobot shares similarities with Julia, and with human CMC users who make use of word association to create the appearance of relevance. Both bots and humans do so for reasons of simplicity: Word association is easy to program, and it is easy for human users to manage even when they are cognitively overloaded with confusing message displays, in that no deeper pragmatic understanding is required of the intended meaning of the utterance being responded to. Thus bots’ “success” is relative to humans’ “failure” – bots appear to be relevant, at least in part, because humans fail to be optimally relevant (cf. Foner 1997). Synchronous, text-based CMC environments, it would seem, lower the standards for relevance, effectively narrowing the gap in performance between humans and machines.

#### **4. Discussion**

In the previous sections, I argued that a causal link exists between two phenomena in synchronous CMC that have previously been considered unrelated: (a) a tendency for disrupted adjacency of logically-related messages (Garcia and Jacobs 1999; Herring 1999) and (b) a tendency for users to produce fanciful (and digressive) utterances (e.g., Danet et al. 1997; Herring and Nix 1997). I propose that a lack of sequential relevance characterizes both phenomena, and that the system constraints that cause (a) lead to (b), which is then adopted by synchronous CMC users in some environments as a communicative norm, as evidenced especially by users’ evaluation of bot conversation as human-like and coherent. Recreational CMC is especially prone to exploiting loosened relevance for humorous and playful effect, but as the examples from the *LinguaMOO* class show, relevance breakdowns occur and may be exploited for play even in pedagogical chat contexts (see also Colomb and Simutis 1996). Moreover, while the examples analyzed in this chapter are of synchronous multi-party chat, disrupted adjacency occurs in other CMC modes that share the properties of sequential posting and 1-way message transmission, including dyadic chat (such as instant messaging) and asynchronous discussion forums (Herring (1999). However, in contexts where the goals are information focused and the communicative dynamics are serious, loosened relevance may not be tolerated or exploited; rather, compensatory strategies may be employed to neutralize its potentially disruptive effects, as the research surveyed in section 2.2 suggests.

Those effects can be attributed directly to properties of the medium. Multi-participant, 1-way CMC systems place demands on users’ attention and understanding. In synchronous CMC, in addition, there are time and typing pressures that adversely affect the complexity of message production (Ko 1996). These factors tend to result in superficial connections across messages, e.g., involving use of simple cohesive strategies such as question and answer adjacency pairs and lexical repetition. Deep coherence that involves complex inferencing is difficult to sustain, especially when multiple interactions are going

on simultaneously and equally “loudly” from the perspective of the user. It follows from this that synchronous text-based CMC is not ideally suited for purposes that involve sustained cross-turn coherence. Conversely, it appears to be well-suited for creative idea generation, relaxation and fun, and for stimulating interaction among people who might not interact otherwise.

If this analysis is correct, it challenges prior characterizations of conversationalists as, by default, aiming to be “optimally relevant” (Sperber and Wilson 1986). CMC users who produce strings of non sequiturs do not appear to be aiming to be optimally relevant or even necessarily relevant at all, so much as aiming to participate in phatic social exchange with (and possibly to be considered provocative, clever, entertaining, and so forth by) other users. That is, in contrast to Yus’s (2003) analysis of joking as relevant but not necessarily cooperative, play with loosened relevance in recreational chat rooms appears to be socially cooperative but not necessarily relevant.

Of course, similar behavior sometimes takes place off the Internet, as for example in informal, playful social interaction among friends (Chiaro 1992), in which the requirement to be optimally relevant is relaxed. Dispensations of optimal relevance as mentioned by Sperber and Wilson (1986) – in the pub with friends, talking to a servant – reflect alternative, context-specific norms of communication. Loosened relevance in recreational CMC can be considered a context-specific norm that grants a similar dispensation, allowing relevance violations even when turn adjacency is not disrupted. The difference is that in multi-participant chat, technological pressures limit interlocutors’ choices. The creative play that arises from loosened relevance online can be viewed as users’ “making the best” of what is in essence a limited communication medium – making it, in Walther’s (1996) word, “hyperpersonal” – or more socially desirable even than face-to-face communication – by optimizing the behaviors it affords.

## **5. Conclusion and future outlook**

Modality of communication makes a difference insofar as relevance is concerned. Whereas optimal relevance may be the ideal for spoken conversation, it is difficult to achieve in computer chat, to the point where experienced users may no longer aim for it. Rather, the computer medium makes available different possibilities which can be exploited for different pragmatic effects, and which give rise to different values about what constitutes “ideal conversation” (e.g., “creativity”, “multiplicity”, “simultaneity”). The analysis presented in this chapter suggests that if the future of human communication were to depend on computer chat, relevance could continue to decline in importance.

For theorists such as Grice and Sperber and Wilson, this is tantamount to saying that meaningful communication itself would be threatened. Indeed, the age is already upon us when humans communicate with computer programs and believe they are talking to other humans, and when bot-to-bot conversations can take place without the presence of humans. Conversation involving non-intentional agents raises even more troubling

prospects for the notion of relevance than does synchronous CMC and deserves to be the subject of future investigation. Meanwhile, multi-party chat is only one mode of CMC among many, and it is declining in use (Madden 2005), while instant messaging, text messaging, and social network sites – all environments that support dyadic interaction – have become more popular, especially among young people (Pew Internet and American Life Project 2010). At the same time, new communication tools are being developed (e.g., Fono and Baeker 2006) that give users more feedback and control over turn-taking, threading (formally indicating that a message is a response to a particular prior message), and participant tracking, affordances that should reduce the incidence of disrupted adjacency and thus of unintended relevance violations. It is a question for future research whether CMC that incorporates these affordances will be as playful or humorous.

## Notes

1. On textual CMC as conversation, see Herring (2010).
2. It should be noted that Lam and Mackiewicz (2007) and Örnberg Berglund (2009) do not equate disrupted adjacency with incoherence. For these researchers, incoherence only exists if the communication gives rise to misunderstanding among participants.
3. Yus (2003) invokes Sperber and Wilson's (1986) Relevance Theory as an alternative explanation for how joking works. Specifically, he argues that "a mental search for an optimally relevant interpretation also covers the processing of humorous discourses and the derivation of humorous effects" (1298) and that joking thus observes Sperber and Wilson's "relevance principle" even if it is not "cooperative" in Grice's (1975) sense.
4. For further information about IRC culture and language, see Danet et al. (1997), Reid (1991), Werry (1996), and Paolillo and Zelenkauskaitė (this volume).
5. For more detailed information about MUD culture and communication, see Cherny (1999), Reid (1994), Turkle (1995), and Paolillo and Zelenkauskaitė (this volume).
6. All of the IRC data were obtained from the EFNNet network.
7. The abbreviated Punjabi greeting *ssa*, or *sat siri akal* (lit. 'God is truth'), means 'hello'.
8. At the time this sample was logged, over 200 users were present in the #chatzone channel.
9. Additional evidence in support this view includes the use of playful non sequiturs by the owners of TinyMUD at an otherwise formal, serious meeting about the MUD's future direction.
10. In more recent AI research, machine learning algorithms have also been employed to enable agents to adapt their behavior ("learn") in response to positive or negative reinforcement (e.g., Isbell, Shelton, Kearns, Singh, and Stone 2001).
11. Newer AI agents, such as Apple's Siri, are similarly programmed with various snappy retorts to sexual come-ons, which are received often by agents with female personae.

A particularly clever example is the following (retrieved November 4, 2011 from <http://shitthatsirisays.tumblr.com/page/10>):

User: Talk dirty to me.

Siri: The carpet needs vacuuming.

Siri's response is ironically self-referential: It appears to be a non sequitur produced as a result of an error in lexical mapping of the sort that AI agents often make. In fact it is pragmatically relevant (via the inference of 'rejection' that is generated by flouting the relevance maxim). This is an example of what Foner (1997: 125) calls "clever but brute-force programming", in which an utterance is pre-programmed as a whole in response to a specific, recurring prompt (e.g., "talk dirty").

12. This line is from a Monty Python television sketch circa 1970 in which a Hungarian tourist attempts to use a maliciously-written English phrasebook to make a purchase from a tobacconist (Wikipedia 2011).

## References

- Attardo, Salvatore 1994 *Linguistic Theories of Humor*. Berlin: Mouton de Gruyter.
- Brown, Gillian and George Yule 1983 *Discourse Analysis*. Cambridge, UK: Cambridge University Press.
- Cherny, Lynn 1999 *Conversation and Community: Chat in a Virtual World*. Stanford: CSLI.
- Chiaro, Delia 1992 *The Language of Jokes: Analysing Verbal Play*. London: Routledge.
- Colomb, Gregory and Joyce Simutis 1996 Visible conversation and academic inquiry: CMC in a culturally diverse classroom. In: Susan C. Herring (ed.), *Computer-Mediated Communication: Linguistic, Social, and Cross-Cultural Perspectives*, 203–222. Amsterdam/Philadelphia: John Benjamins.
- Danet, Brenda 2001 *Cyberpl@y*. London: Berg.
- Danet, Brenda, Lucia Ruedenberg-Wright, and Yehudit Rosenbaum-Tamari 1997 Smoking dope at a virtual party: Writing, play and performance on Internet Relay Chat. *Journal of Computer-Mediated Communication* 2(4). <http://onlinelibrary.wiley.com.ezproxy.lib.indiana.edu/doi/10.1111/j.1083-6101.1997.tb00195.x/full>
- Foner, Leonard N. 1997 Entertaining agents: A sociological case study. In: *Proceedings of the First International Conference on Autonomous Agents*. <http://dl.acm.org.ezproxy.lib.indiana.edu/citation.cfm?id=267658.267684>
- Fono, David and Ron Baecker 2006 Structuring and supporting persistent chat conversations. In: *Proceedings of the 2006 ACM Conference on Computer Supported Cooperative Work*. New York: ACM.

- Garcia, Angela and Jennifer Jacobs 1999 The eyes of the beholder: Understanding the turn taking system in quasi-synchronous computer mediated communication. *Research on Language and Social Interaction* 32(4): 337–367.
- Grice, H. Paul 1975 Logic and conversation. *Syntax and Semantics* vol. 3: *Speech Acts*, ed. by Peter Cole and Jerry L. Morgan, 225–242. New York: Academic Press.
- Halliday, M. A. K. and Ruqaya Hassan. 1976 *Cohesion in English*. London: Longman.
- Herring, Susan C. 1997 Humor that binds: Joking and coherence in Internet Relay Chat. Paper presented at the International Society for Humor Studies conference, University of Oklahoma, July 13.
- Herring, Susan C. 1999 Interactional coherence in CMC. *Journal of Computer-Mediated Communication* 4(4). <http://jcmc.indiana.edu/vol4/issue4/herring.html>
- Herring, Susan C. 2010 Computer-mediated conversation: Introduction and overview. *Language@Internet* 7, article 2. <http://www.languageatinternet.org/articles/2010/2801>
- Herring, Susan C. and Carole Nix 1997 Is “serious chat” an oxymoron? Academic vs. social uses of Internet Relay Chat. Paper presented at the American Association of Applied Linguistics annual conference, Orlando, Florida, March 11.
- Ho, Chia-Hua and Karen Swan 2007 Evaluating online conversation in an asynchronous learning environment: An application of Grice’s Cooperative Principle. *Internet and Higher Education* 10: 3–14.
- Isbell, Charles Lee, Michael Kearns, Dave Kormann, Satinder Singh, and Peter Stone 2000 Cobot in LambdaMOO: A social statistics agent. In: *Proceedings of the American Association for Artificial Intelligence 2000*. <http://www.aaai.org/Papers/AAAI/2000/AAAI00-006.pdf>
- Isbell, Charles, Christian R. Shelton, Michael Kearns, Satinder Singh, and Peter Stone 2001 A social reinforcement learning agent. In: *AGENTS’01: Proceedings of the Fifth International Conference on Autonomous Agents*. New York: ACM.
- Ko, Kwang-Kyu 1996 Structural characteristics of computer-mediated language: A comparative analysis of InterChange discourse. *Electronic Journal of Communication* 6(3). <http://www.cios.org/www/ejc/v6n396.htm>
- Lam, Chris and Jo Mackiewicz 2007 A case study of coherence in workplace instant messaging. In: *Proceedings of the International Professional Communication Conference (IPCC) 2007*. [http://www.iit.edu/~lamchri/documents/IPCC\\_2007-jm-7-24-07.pdf](http://www.iit.edu/~lamchri/documents/IPCC_2007-jm-7-24-07.pdf)
- Madden, Mary 2005 New demographic info and activities data. *Pew Internet and American Life Project*. <http://www.pewinternet.org/Commentary/2005/May/New-Demographic-Info-and-Activities-Data.aspx>

- McCann, C. Douglas and Tory E. Higgins 1992 Personal and contextual factors in communication: A review of the “communication game”. In: Gün R. Semin and Klaus Fiedler (eds.), *Language, Interaction, and Social Cognition*, 144–172. Newbury Park, CA: Sage.
- McCarthy, John C., Peter C. Wright, and Andrew F. Monk 1992 Coherence in text-based electronic conferencing: Coupling text and content. *Journal of Language and Social Psychology* 11: 267–277.
- Nunan, David 1993 *Introducing Discourse Analysis*. Harmondsworth, UK: Penguin.
- Örnberg Berglund, Therese 2009 Disrupted turn adjacency and coherence maintenance in Instant Messaging conversations. *Language@Internet* 6, article 2.  
<http://www.languageatinternet.org/articles/2009/2106/Berglund.pdf>
- Paolillo, John C. 2011 Conversational codeswitching on Usenet and Internet Relay Chat. *Language@Internet* 8, article 3. <http://www.languageatinternet.org/articles/2011/Paolillo>
- Pew Internet and American Life Project 2010 Trend data for teens. *Pew Internet and American Life Project*. <http://pewinternet.org/Trend-Data-for-Teens/Usage-Over-Time.aspx>
- Reid, Elizabeth M. 1991 Electropolis: Communication and Community on Internet Relay Chat. Senior Honours thesis, University of Melbourne, Australia. <http://www.ee.mu.oz.au/papers/emr/index.html>
- Reid, Elizabeth M. 1994 Cultural Formations in Text-Based Virtual Realities. Master’s thesis, University of Melbourne, Australia. <http://www.ee.mu.oz.au/papers/emr/index.html>
- Schwarz, Norbert 1996 *Cognition and Communication: Judgmental Biases, Research Methods and the Logic of Conversation*. Hillsdale, NJ: Erlbaum.
- Sperber, Dan and Dierdre Wilson 1986 *Relevance: Communication and Cognition*. Cambridge, MA: Harvard University Press.
- Turkle, Sherry 1995 *Life on the Screen*. New York: Simon & Schuster.
- Weizenbaum, Joshua 1966 ELIZA - A computer program for the study of natural language communication between man and machine. *Communications of the ACM* 9(1): 36–45.
- Walther, Joseph B. 1996 Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research* 23(1): 3–43.
- Werry, Christopher C. 1996 Linguistic and interactional features of Internet Relay Chat. In: Susan C. Herring (ed.), *Computer-Mediated Communication: Linguistic, Social and Cross-Cultural Perspectives*, 47–63. Amsterdam/Philadelphia: John Benjamins.
- Wikipedia 2011 *Dirty Hungarian Phrasebook*.  
[http://en.wikipedia.org/wiki/Dirty\\_Hungarian\\_Phrasebook](http://en.wikipedia.org/wiki/Dirty_Hungarian_Phrasebook) [accessed 7:15 pm EDT, November 3, 2011]

Yus, Francisco 2003 Humor and the search for relevance. *Journal of Pragmatics* 35: 1295–1331.

Yus, Francisco 2010 *Cyberpragmatics: Internet-Mediated Communication in Context*. Amsterdam/Philadelphia: John Benjamins.