

Computer Mediated Communication as a Force in Language Change

Naomi S. Baron

*Department of Linguistics, Brown University
Providence, Rhode Island*

This paper develops a formalized linguistic perspective from which to explore how the medium of communication influences both what ideas can be expressed and how these ideas are expressed. This linguistic perspective enables the use of computers as a replacement for writing, and as a replacement for speech, to be examined in detail. The asymmetric influences between writing and speech are discussed. It is possible to anticipate some of the changes that may occur to these traditional means of communication as people make increasing use of computerized systems for information exchange. The linguistic concept of "register" is extended to computer-based communications, and it is noted that there is an increased tendency for aggression to be displayed when talking terminal to terminal. Finally, the impact of developments in networking and computer conferencing on the social uses of communication are considered.

If a Martian were to land on planet Earth tomorrow, one of the first oddities he would need to come to grips with would be the computer. From media blitzes to classrooms to boardrooms, computers are — for better or worse — dominating an increasing portion of our personal and social lives. This snowball effect is especially hastened by the proliferation of microcomputers and interactive terminals that make it possible for users to get immediate "responses" from their computers or to communicate with other users.

Much has been written about the potential effects of computers upon various aspects of American life: democracy (predicted to increase, assuming the economically disadvantaged can get access to computers); the unemployment rate (feared to increase, as robots replace unskilled laborers and craftsmen alike); interpersonal skills (in need of safeguarding, if the stereotype of the dishevelled, antisocial computer hacker is to be believed). This paper, however, will examine the potential effects of computers upon a rather different aspect of human life: the effect of computers upon language.

In the world of computers, discussions of "computers and language" are usually about artificial computer languages, such as Pascal, FORTRAN, or C.

Any talk of computers and *natural* languages (such as English or Japanese) is likely to concern so-called natural language processing—that is, the use of computers to analyze the syntax or semantics (or both) of ordinary language.

But there is yet a third dimension to the study of computers and language. That is the growing use of computers as *conduits* of natural language. Instead of speaking face-to-face with one another or using traditional means of writing, we express ourselves at the computer keyboard.

Computer mediated communication is used in a variety of communicative contexts. Perhaps the best known is word processing. Other common natural language uses of computers include questionnaires (such as used in taking medical histories) or business systems that allow the user to employ a subset of English vocabulary and grammar to pose questions of a data base. Finally, a growing number of universities and businesses — as well as private individuals — are developing the ability to exchange electronic mail or participate in real-time computer conferencing, where the participants are all logged onto the computer at the same time.

It is clear that the proliferation of computers will have a growing effect upon the physical means by which we use natural language with one another. Less clear is the issue of whether the use of the computer as a linguistic medium will affect the very shape and functioning of traditional language itself. The purpose of the present paper is to explore this question.

We begin (Part I. The linguistic perspective) by considering computer mediated communication in context of a broader set of linguistic issues. What modalities of human communication (e.g., face-to-face speech, telephones, writing letters) are possible, and how do they differ from one another? Does the modality of communication influence what we can express in language? Do the forms and functions of one linguistic modality (e.g., writing) ever influence those of another (e.g., speaking)?

Drawing upon this linguistic framework, Part II of the paper (The computer perspective) analyzes computer mediated communication as a formal modality of linguistic communication. We will look at the use of computers as a replacement for writing and as a replacement for speech, and see what our findings tell us about the communication spectrum more generally.

The final section (Part III. The future perspective) ventures into the domain of historical change. In addition to making some general predictions about the kinds of linguistic change we might expect as a result of continuing growth in computer mediated communication, we will also consider the possible implications of such change.

PART I. THE LINGUISTIC PERSPECTIVE

The Communication Spectrum

Theoretical linguists (e.g., Chomsky, 1965) are prone to speak of human language as if it were all of a piece. On the other hand, sociolinguists (e.g., Hymes, 1964, 1974) are traditionally more attuned to the variety of physical contexts in which linguistic exchange can occur, and, derivatively, to the linguistic implications of these physical differences.

Most analyses of linguistic interaction are based upon the paradigm of two people speaking with one another face-to-face. However, in literate and in technological societies, there are several other options as well. We can write books or letters, we can telephone one another, we can view and hear an interlocutor at a distance through teleconferencing, or we can send our interlocutor a message via a computer (so-called keyboarding).

In Figure 1 these communication options are arranged in a continuum that is organized with respect to the physical and visual distance between producer and perceiver (e.g., speaker/hearer or writer/reader). A concomitant variable is the extent to which the producer can receive feedback from the interlocutor. As you can see, at the far left end of the spectrum (face-to-face speech), the interlocutors are in one another's physical (including visual) presence, and feedback possibilities are maximized. At the far right end of the spectrum (traditional written language), the interlocutors may be separated in time and space, and feedback is difficult if not impossible. The other modes of communication fall somewhere in between. (For a more detailed discussion, see Baron, 1981).

Face-to-Face Speech	Videophones Teleconferencing	Telephones	Computers	(Traditional) Writing
physical and visual presence immediate feedback				producer distant from receiver in time and space feedback more complex (or impossible)

Figure 1. The communication spectrum.

What effect do the physical distinctions between these linguistic modalities have upon the character of the linguistic message itself or the effect the message may be expected to have? A useful way of thinking about this question is to identify at least some of the specific factors that are relevant in human communication, and to see how they vary along the communication spectrum we described in Figure 1. At the same time, we can note variables that are present in only a limited number of linguistic modalities.

Figure 2 offers some of the salient communication variables, grouped together in three categories: physical, linguistic, and social. The right-hand column (“Directionality it is typically associated with”) pairs up the variables with the communication spectrum in Figure 1.

	Variable	Directionality it is typically associated with
Physical	physical presence (e.g., smell, nuance of kinesics, nuance of intonation)	decreases: face-to-face → videophone/teleconferencing
	non-linguistic context	decreases: face-to-face → videophone/teleconferencing
	possibility for immediate feedback	decreases →
	time for reflection	increases →
Linguistic	formality	increases →
	grammaticality (degree, complexity)	increases →
	logical coherence	increases →
Social	equalizing of social distance	increases →
	possibility for concealment (of fear, of physical conditions, of identity)	increases →
	degree of honesty/depth of feeling willing to express	increases →

Figure 2. Major communication variables.

The first two variables (physical presence and non-linguistic context) are only fully applicable to face-to-face spoken communication, where your interlocutor can, for example, see you wink as you say, “Of course I’ll be home by five,” or can see the glass you have broken just before uttering an expletive. These two variables still apply, though to a lessened degree, when the interlocutors can see one another yet are not physically proximate (e.g., I can’t smell my interlocutor’s perfume over a videophone). Once visual contact is removed (with telephones, computers, and traditional writing), the variables of “physical presence” and “non-linguistic context” become inoperative.

With the third physical variable—i.e., possibilities for feedback—the strength of the variable *diminishes* as we move from the left edge of the spectrum (face-to-face speech) to the right edge (traditional written language). I

can interrupt an insurance salesman and say I don't understand the terms of the contract he is proposing. There is no way I can ask Immanuel Kant for clarification of *The Critique of Pure Reason*.

All of the other variables suggested in Figure 2 *increase* in value in traversing the space between speech and writing. For example, as we move away from face-to-face spoken encounters towards the use of telephones, computer mediated communication, and finally writing, the interlocutors have greater time to reflect upon the message they will send, a greater chance of grammatical and logical coherence, and the opportunity to make significant alterations in their social relationships with one another.

The Role of Modality

To illustrate how these variables actually apply to a particular modality of human communication, consider the case of the telephone. Halfway between speech and writing on our communication spectrum, telephones remove the interlocutors from physical proximity, while retaining some possibilities for feedback.

It is typically assumed (e.g., Nash and Nash, 1982) that telephone conversations serve to *supplement* normal face-to-face communication, rather than to replace such face-to-face exchange. The lack of physical proximity is overcome because "Persons using the telephone retain impressions from previous [face-to-face] experiences" (Nash and Nash, 1982:195).

However, even in the early decades of telephone use, it became clear to sociologists that the very presence of the telephone alters normal face-to-face communication. In their first classic study of Middletown in the 1920's, Robert and Helen Lynd reported that "a steady historical decline in face-to-face neighboring in Middletown first began [with the spread of the telephone]; direct confrontation being slowly replaced and superceded by the more attenuated voice-to-voice social contact of the telephone" (Ball, 1968:63). More generally, telephones allow interlocutors to distance themselves from one another by, among other things, (1) concentrating on their conversational presentations and (2) ignoring or even misrepresenting "those aspects of appearance which might be not only relevant, but also damaging should they be seen and reacted to by the conversational other" (Ball 1968:71).

A number of studies have contrasted telephone behavior with face-to-face conversation. In a naturalistic study of how managers speak on the telephone and in person, Reid (1977) observed that telephone conversations were: (1) briefer, (2) more spontaneous (i.e., not planned in advance), (3) more single-minded (i.e., dealt with a single subject), and (4) basically initiated to inform or instruct (e.g., not to have general discussion or social conversation).

In a second set of experimental studies, Reid (1977) compared the use of telephones versus face-to-face communication where the goal was to

accomplish a variety of tasks. When the task involved conveying simple information or solving a problem, there were no significant differences between the conversations occurring in the two modalities. However, significant differences did appear when the task involved conflict resolution or expressing one's perception of other people. Use of the telephone had the following effects upon subjects' linguistic and attitudinal responses: (1) more failures to reach agreement, (2) longer time to reach agreement, (3) the side having the "stronger case" achieved more victories (while the side arguing on the basis of "strength of personal convictions" did less well), (4) more opinion change, (5) lower confidence in own judgment (e.g., less confidence in whether had explained something clearly or not), and (6) tendency to rate other people less favorably.

When we consider empirical studies of face-to-face versus computer mediated communication (Part II), we will observe striking parallels between the kinds of language and social behavior resulting from telephone use on the one hand, and computer mediated communication on the other.

Modal Influence

We have seen that by using alternative modalities of linguistic communication, we can produce markedly different sorts of linguistic (and resulting attitudinal or social) behavior. But the power of linguistic modalities does not necessarily stop there. When one mode of communication becomes well publicized or is valued as a source of prestige, that modality can actually influence the linguistic shape of *another* modality (see Baron, 1981). And so, for example, norms appropriate to speech may be adopted in writing, or more to the point, norms characteristic of computer mediated communication may change generally accepted standards for spoken or traditionally written language. Hence, the analysis of a particular linguistic modality (such as computer mediated communication) becomes important not only in its own right, but with regard to the influence it can have on the language more generally. (See Baron, 1979, for further discussion of cross-modal linguistic influences.)

Consider examples of the influence that written English has historically exerted on spoken English, and *vice versa* (Figure 3). In the case of writing influencing speech, one of the most obvious examples is so-called spelling pronunciation. Take a word like *lamb*. We all know that the final *b* is not pronounced. But what about words like *pound* or *thousand* or *blind*, which also end in a nasal consonant (i.e., /n/ or /m/) plus a final voiced stop consonant (here a /b/ or /d/)? Today we pronounce the final /d/ in *pound*, *thousand*, and *blind*. Yet this may well be a pronunciation induced by looking at the spelling. There is evidence that in the fifteenth, sixteenth, and seventeenth centuries, the final /d/ was not pronounced (Bloomfield, 1933:488).

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. spelling pronunciations 2. drawing quotation marks in the air 3. professorial speech | <ol style="list-style-type: none"> 1. written use of contractions 2. general tendency for writing to become a transcription of speech |
|---|---|

Figure 3. Examples of cross-modal influence.

Writing can also be seen to influence speech in more subtle ways. It is common place to see a speaker “draw” quotation marks in the air to highlight a word or phrase, and the abbreviations *e.g.* and *viz.* have made it into some academicians’ vocabulary. As a final example, consider what we might call “professorial speech.” It has often been observed on American college campuses that some members of the faculty “talk the way that they write.” One student at Brown University observed that an English teacher on campus was the only person she had ever heard use the word *hence* in spoken conversation.

The influence of spoken English on written English is at once more pervasive but harder to detect. There are a few obvious cases, such as the blurring of traditional distinctions between spoken and written style with respect to contractions. (The conventional ban against using contractions in writing seems to have all but disappeared.) This blurring of stylistic distinctions is part of a more general tendency in American English to make writing increasingly function as a “mere transcription of speech” (Bloomfield, 1933:21). While traditional distinctions between spoken and written style in English have never been as stark as the comparable distinctions in, for example, Japanese (Clancy, 1982) or Chinese (Li and Thompson, 1982), spoken and written English have historically been distinguishable from one another in both form and function (e.g., Tannen, 1982a, 1982b; Kroll and Vann, 1981; Stubbs, 1980; Ong, 1982). Even casual familiarity with the “formal” writing of contemporary American adolescents and young adults suggests these distinctions are rapidly diminishing.

PART II. THE COMPUTER PERSPECTIVE

Defining the Variables

Having set the linguistic stage, we can now look at the use of computer mediated communication not so much as part of a discussion about computers in general, but rather as part of the study of human language. Therefore, the communicative variables that will be of interest to us are much the same as we saw in our discussion of speech or writing or telephones as alternative modalities of human linguistic communication.

In discussing empirical studies of computer mediated communication, we will need to consider the effects of physical, linguistic, and social variables (see Figure 2, above). In the case of *physical* variables, for example, we might consider whether computer mediated communication has evolved (or could evolve) means of compensating for the lack of physical presence or non-linguistic context. (How, for example, do you let your interlocutor know indirectly that you didn't have enough sleep last night and are in a foul mood?) In the *linguistic* domain, we might ask whether computer mediated communication increases (or decreases) levels of grammaticality or general linguistic sophistication. Similarly, we might investigate whether there are grammatical differences between spoken or written language on the one hand, and computer mediated communication on the other. (An example might be the choice of pronouns to refer to the second person interlocutor — e.g., *tu* versus *vous* in French, or *Du* versus *Zie* in German, or the use of honorifics in Japanese when addressing comparative strangers on the terminal.) And finally, there is the domain of *social* variables: Does computer mediated communication lessen or increase levels of social distance? Does it affect the extent to which interlocutors participate in a conversation, or how honest they are in expressing their opinions?

General Social Effects of Computer Mediated Communication

We will consider these communicative variables by looking at the specific ways in which computer mediated communication is being used to supplant traditional written and spoken language. In the process, we will consider the specific effects those forms of computer mediated communication may be having upon the other forms of human linguistic communication. First, though, it may be useful to get an overview of some of the general reactions that “initiates” have to using computers, since these general reactions may color the specific linguistic outcomes we will be considering.

The most important concept for us to understand here is that many people perceive computers (and the use of computers) as alien, intimidating, and a personal threat. Sara Kiesler and her associates at Carnegie-Mellon University (Sproull *et al.* in press) go so far as to characterize the process of learning to use a computer for programming, word processing, or class assignments as equivalent to entering an alien culture. Shoshana Zuboff (1982) of Harvard Business School, in her studies of employees' reactions to the introduction of computers into the workplace, cautions that for all their advantages, computers can end up introducing much unintended alienation. Workers feel manipulated by the computer (“You have to work the way the system wants you to” — Zuboff, 1982:145). Even managers lose a sense of what they are managing. As one collections supervisor put it: “If you work with a manual system and you want to see an account on a given day, you have a paper file

and you simply go to that particular section and pull out the file. When you're in the computer system, in a sense all your accounts are kind of floating around in space. You can't get your hands on them" (Zuboff, 1982:146). And in the domain of medicine, where so-called "expert systems" have been designed to aid physicians in making diagnoses and prescribing treatment, there is considerable suspicion of computer programs designed by unknown outsiders (Shortliffe, 1980).

In our study of computer mediated communication, we will not be able to look directly at the linguistic effects that these generally negative attitudes towards computers might be having on the use of, say, electronic mail or computer conferencing. However, we need to be aware that the results of empirical studies of computer mediated communication may well be confounded by more general attitudes towards computers. The user who believes computers to be "dehumanizing" may decide that only "objective" communication is appropriate in using a machine. The user who judges computers to be high tech's answer to CB radios and late night talk shows is already predisposed to use the system for baring some of his most private thoughts.

Types of Computer Mediated Communication

In studying the linguistic implications of computer mediated communication, it is useful to begin with a clear notion of the types of communication that can take place. The first distinction we need to draw is between uses of the computer to replace traditional functions of written language, and uses of computer mediated communication to replace speech. The second important variable is the number of interlocutors in the exchange: Is the computer mediated communication directed to one interlocutor, or to several? And third, there is the question of familiarity: Does the message sender know the identity of the interlocutor(s)?

Figure 4 presents the major ways in which computer mediated communication is used to replace traditional written language. There are at least five arrangements via which this replacement can be accomplished. In three instances (use of a data base, word processing, and electronic mail₁), the message sender is dealing with a single, known interlocutor — which may be himself or even a computer program. In a fourth case, electronic mail₂ can be sent to a finite set of interlocutors. Finally, in the instance of electronic bulletin boards₁, the sender "broadcasts" a piece of "writing" (such as a research report) to a broad community. The size of the community is not determined by the sender but by who has access to the bulletin board.

	Single Interlocutor	Multiple Interlocutors
<i>Known Interlocutor</i>	data base (other = computer program) word processing (other = self) electronic mail ₁ (other = specific person not immediately available)	electronic mail ₂ (other = known community of finite size, where community is not immediately available)
<i>Unknown Interlocutor</i>		electronic bulletin board ₁ (other = non-enumerable community, where community is not immediately available)

Figure 4. Use of computers in place of writing

The use of computer mediated communication in place of speech can be described (Figure 5) with the same two-by-two matrix we have just used for writing. Electronic mail₃ can be sent to a single, known interlocutor where sender and receiver are logged onto the computer system simultaneously. This condition is most analogous to a telephone call between acquaintances. When more than one known interlocutor is logged onto the system, we enter the realm of computer conferencing₁. (The analog here is a conference call.)

	Single Interlocutor	Multiple Interlocutors
<i>Known Interlocutor</i>	electronic mail ₃ (other = specific person immediately available)	computer conferencing ₁ (other = community of finite size, where community is immediately available)
<i>Unknown Interlocutor</i>	e.g., medical history (other = physician, although immediately available other = computer program) social introduction (other = "blind date")	computer conferencing ₂ (other = unknown community of finite size, where community is immediately available) electronic bulletin board ₂ (other = non-enumerable community, where community is immediately available)

Figure 5. Use of computers in place of speech

A third case in which computer mediated communication is used in lieu of speech occurs when a message sender communicates with a single unknown interlocutor. Even when the message sender is directly interacting with a computer program, the sender knows that the message input will be interpreted by some specific (though unknown) person. Examples of this situation are the use of computers (rather than physicians) for taking initial medical histories, or the use of electronic mail systems as dating services.

Our final two cases involve using computer mediated communication to “speak” with multiple listeners with whom the message sender is not familiar. In one case (computer conferencing₂), the sender knows that his audience is limited, though he does not know who the members of that audience are. In the other case (electronic bulletin boards₂), the “speaker” broadcasts a message to anyone who happens to be on the network (much like a CB radio operator).

It is likely that as computer mediated communication evolves, new types of replacement functions will emerge for traditional writing and speech. They should, however, all be describable in terms of the framework presented in Figures 4 and 5.

Experimental Studies

Linguistic studies of computer mediated communication are still in their infancy, barely reaching beyond the realm of anecdotal observation. This paucity of studies is especially true of computer mediated communication in place of writing. Businesses extol the virtues of data based management systems, especially those such as Intellect, which can be accessed by means of natural language (Harris, 1983; Eisenberg and Hill, 1984). Writers (or typists) of all ilk praise the time-saving features of word processing, and teachers of writing frequently report that student compositions improve in overall quality when the process of revision doesn't require retyping the entire manuscript. Electronic mail offers a welcome respite from the endless game of telephone tag, and electronic bulletin boards provide a willing cadre of evaluators of new ideas or readers of first drafts. But few of these observations have been measured using the traditional canons of scientific methodology.

A handful of researchers are, however, now studying some of the uses of computer mediated communication in place of speech. One cluster of studies (Slack *et al.*, 1966; Grossman *et al.*, 1971) compares medical histories that physicians take from patients with the histories patients produce themselves at a computer terminal in response to a menu-driven questionnaire. The studies suggest not only that most patients are comfortable with their computer interaction, but also that patients sometimes give more complete and correct histories when interacting with computers than when facing the physician directly. This finding is consonant with results of earlier telephone studies (Lester, 1977) which found that the anonymity provided by telephones in

psychological counselling, psychotherapy, and crisis intervention often encouraged greater openness on the part of the person seeking help than was possible in face-to-face interaction.

Another type of study considers what happens when strangers “meet” on the computer. Kiesler, Zubrow, Moser, and Geller (ms.) compared physiological responses of strangers who conversed with one another on the computer or face-to-face. Measuring such factors as pore size and pulse, the investigators found that communication via computer is not as physically arousing as face-to-face communication. At the same time, while face-to-face meetings were initially more physically stressful, the participants meeting face-to-face ended up liking one another better than did their computer-conversing counterparts.

The major work on the use of computer mediated communication in lieu of speaking has been done on computer conferencing, with both known and unknown interlocutors. The primary researchers here have been S. Roxanne Hiltz of Upsala College, Murray Turoff of the New Jersey Institute of Technology, and Sara Kiesler of Carnegie-Mellon University (Hiltz and Turoff, 1978; Hiltz, Johnson, Aronovitch, and Turoff, 1980; Kerr and Hiltz, 1982; Hiltz, 1984; Kiesler, Siegel, and McGuire, in press; Sproull, Kiesler, and Zubrow, in press; Siegel, Dubrovsky, Kiesler, and McGuire, ms.). Hiltz and Turoff have done naturalistic observations of computer conferencing, along with experimental comparisons of face-to-face speech versus computer conferencing. Kiesler and her colleagues have focused on experimental comparisons of face-to-face speech versus computer conferencing, including comparisons between known and unknown interlocutors. In the various experimental studies of these researchers and their associates, participants in the experiments were set tasks such as resolving a dilemma, and the resulting language produced in the two experimental situations was compared.

Taken as a whole, the experimental studies of computer conferencing reveal a number of consistent and striking results. These are summarized in Figure 6. We have grouped these results in terms of the three broad communicative variables we defined earlier: physical, linguistic, and social.

Consider first the *physical* variables. Investigators consistently report that subjects take longer to reach a decision when communicating by computer than when speaking face-to-face. (Recall that we observed a similar finding with telephone communication.) What causes this longer conversation time? It might be argued that the increased time results, at least in part, from the lack of feedback from kinesic cues (e.g., head nods) that speakers often use to convey messages or ensure they are being understood (Kiesler, Siegel, and McGuire, in press). We know almost nothing about how participants in computer conferencing compensate more generally for lack of physical presence and non-linguistic context. Researchers have noted anecdotally (e.g.,

	Computer Sessions	Face-to-Face Sessions
<i>Physical</i>	took longer to reach a decision	shorter time to reach a decision
<i>Linguistic</i>	arguments and swearing (flaming) common reduction of register shifts efficient transmission of "hard data"; inefficient transmission of "soft" (subjective) data	arguments and swearing less common maintenance of register shifts both "hard" and "soft" data equally communicable
<i>Social</i>	more democratic (everyone got a chance) more shifting in position from initial position focus on message, not people	often one person dominated decision less shifting in position from initial position possibility of focusing on people or on message

Figure 6. General results of computer conferencing versus face-to-face communication.

Turoff, personal communication) that participants in computer conferencing literally type such messages as "I'm in a bad mood" or indicate laughter with "Ha Ha." Not surprisingly, deaf people communicating over teletypewriters express emotion, intonation, and conversational pauses (e.g., "hum") in much the same way (Nash and Nash, 1982).

Our current understanding of *linguistic* variables is especially tenuous, yet the existing research does suggest a number of testable hypotheses. The studies agree that computer conferencing fosters the use of a very particular (and homogeneous) conversational style. Most striking is the great frequency of arguments and so-called "flaming" (i.e., speaking incessantly, hurling insults, using profanity) in computer conferencing. In these studies, the conversation of participants in computer conferencing was consistently rowdier than that of their face-to-face counterparts.

Why is this so? There are several possible hypotheses. One is that the lack of visual and non-linguistic cues puts added pressure upon the participants to use any means possible (such as haranguing) to ensure they are being understood (Kiesler, Siegel, and McGuire, in press). (This hypothesis would not explain why deaf speakers using teletypewriters do not resort to the same linguistic tactics.) A second possibility is that computer mediated communication is so new that an appropriate etiquette for computer conferencing has yet to develop (Kiesler, Siegel, and McGuire, in press). Third, we might argue that the linguistic free-for-all so characteristic of computer conferencing results from the masking of status differences between participants (a point we will return to in a moment).

Whatever the explanation, it is clear that from a formal linguistic perspective we would predict a general reduction (or even elimination) of the register shifts that characterize traditional spoken and written communication (Hudson, 1980; Basso, 1974). In future studies, the following hypotheses might be tested:

In computer conferencing, participants use

- (1) a narrower range of vocabulary (excluding both “formal” words and words they don’t know how to spell)
- (2) fewer subordinate clauses in sentences
- (3) fewer markers of respect (e.g., words such as *please*, use of titles, choice of grammatical markers of respect such as *vous* in French or *Zie* in German)

than in face-to-face communication.

A second linguistic variable concerns the semantic nature of the message being transmitted. As with the telephone studies, the studies of computer conferencing report that “objective” information can be efficiently transmitted, but “soft” or “subjective” data are often difficult if not impossible to convey. (Recall that in the telephone studies, participants having “the stronger case” achieved more victories than those arguing on the basis of personal convictions.)

Finally, consider the *social* effects of computer conferencing. The most salient of these effects is the heightened degree of participation in computer conferencing as opposed to face-to-face communication. Shyness and inferior position in the organizational hierarchy, which often hamper full participation in face-to-face communication, are offset in computer conferencing by the mask of visual anonymity. In computer conferencing, it is difficult for one person to dominate the conversation and impose his or her views upon others. As a result, we should not be surprised to learn that participants in computer conferencing are more likely to shift their position in the course of conversation than are their counterparts in face-to-face communication. (The telephone studies yielded similar findings.)

An important social consequence follows from this increased “democratization,” this flexibility in changing one’s mind, and the linguistic finding that “soft” information is more difficult to convey than “hard” information. And that is, that participants in computer conferencing tend to focus on the “message,” not the other participants (Siegel, Dubrovsky, Kiesler, and McGuire, ms.). Given the lack of non-linguistic cues, this finding should not surprise us. However, as we will see in Part III, it may give us reason for pause.

Interaction without Audience: A Summary of Trends

We have considered in some detail the style of communication that results from computer mediated interaction, and made occasional comparisons with results from telephone studies. At this point, we can use the findings about both telephone conversation and computer mediated communication to reflect upon our initial communication spectrum (Figure 1). As you recall, the basic organizing principle in this spectrum was spatial and temporal proximity of interlocutors. In the case of face-to-face communication, speaker and hearer are physically proximate. In the case of writing, writer and reader are typically removed in both time and space. Both the telephone and the computer represent intermediate points on this continuum.

Our discussion of telephone use and computer mediated communication pointed up some of the consequences of spatial and temporal distancing. In Figure 7, we incorporate this discussion into a more general analysis of the potential advantages and potential disadvantages that come with spatial and temporal distancing in language.

	Potential Advantages	Potential Disadvantages
<i>Spatial Distancing (Not face-to-face)</i>	anonymity social equalizer reduced distractions increased importance of logical argument	reduced feedback (loss of communicative nuance) social distancing
<i>Temporal Distancing (Lag between production and perception, perception and response)</i>	opportunity to contemplate message, response opportunity to reformulate, correct both production and response physical convenience	writer's block conditions (no impetus from interlocutor to continue) reduction of language as a means of phatic communication (social bonding)

Figure 7. Spatial and temporal distancing in human communication: some pros and cons.

Begin first with the advantages. By removing visual contact between interlocutors, the message producer attains a degree of anonymity that often allows a greater degree of forthrightness than is possible in face-to-face encounters. The importance of anonymity can also be observed in more traditional forms of communication such as graffiti. Besides the "flaming" found on New York subway cars or on bus station walls, one can also find graffiti that expresses more personal and even intellectual messages than their

authors are willing to convey to a known other. A recent example appeared in a ladies room at Emory University:

Saw [former President Jimmy] Carter speak — said he hoped E[mory] U[niversity]’s student body would have a “stirring of social responsibility”, which he said, at this point has not happened. I began running over in my mind — why not? Why do we, as the student body, lack social responsibility? What can we do to initiate and nurture this “stirring”?

Face-to-face discussions of this sort are rare at best on contemporary American campuses.

Along with anonymity comes not only the “democratization” we have discussed earlier, but a freedom from external distraction. The shy coed may feel more at ease asking questions of her professor over the computer than alone face-to-face in his office. From the other side of the table, the professor can concentrate on his message and not worry about how messy the office is or whether his shirt is torn.

Temporal distancing reinforces some of these same advantages, while contributing additional advantages as well. When the interlocutor is not “on line” (e.g., using electronic mail when the interlocutor is not immediately available to receive the message), the producer has the leeway of contemplating what he wants to say or of revising a message (or text) before transmitting (or printing) it. Finally, as we have earlier seen, systems such as electronic mail free interlocutors from waiting by the telephone or relying on the postal system.

Spatial and temporal distancing bear concomitant disadvantages as well. We have commented several times on the loss of communicative nuances that comes with decreased feedback. Such phenomena as flaming may be attempts to compensate for the absence of facial expressions or intonation patterns in computer mediated communication (perhaps analogous to children “signing” their letters *love and XXX*, i.e., kisses). And the negative consequence of anonymity, democratization, and reduced distractions may be a general social distancing between participants (a point we will return to shortly).

Finally, temporal distancing brings with it some familiar disadvantages. Since no interlocutor is physically awaiting a response, the message sender’s opportunity for contemplation and revision can well change into writer’s block. The temporal absence of the interlocutor also typically reduces the possibility that the linguistic exchange can be used for general purposes of social bonding between the participants. Exceptions can, of course, develop, as in the case of the important letter writing tradition of eighteenth- and nineteenth-century Europe, or in stylized genres such as love letters.

PART III. THE FUTURE PERSPECTIVE

We have been looking at the linguistic consequences of several types of human communication, especially those involving the computer. We then went on to evaluate the potential advantages or disadvantages of such consequences.

The act of evaluation can be interpreted in two ways. On the one hand, we can simply observe the limitations (or strengths) of a particular modality in and of itself, and assume that any limitations will somehow be counter-balanced by the virtues of other linguistic modalities. On the other hand, we can ask whether a given modality is likely to overshadow or even essentially replace other communicative modalities and, if so, what the consequences of such an event would be. In Part II, we dealt with computer mediated communication largely in isolation. In this section, we will focus upon the question of influence: Is computer mediated communication likely to influence the way we speak and write, and, if so, of what consequence might such influence be?

A discussion of future linguistic change and its potential consequences presupposes first, that it is reasonable to speak of predicting linguistic change, and second, that it is legitimate to evaluate linguistic expressions and judge one to be in some way "better" than another. Therefore, before considering how computer mediated communication may affect other linguistic modalities, we will briefly address the issues of prediction and prescriptivism in language.

Divining the Future

Is it possible to predict language change? According to the American structuralist tradition (e.g., Hockett, 1965), the answer was emphatically "no." Language change, at least at the phonological and syntactic levels, was assumed to be random.

Other models of linguistic analysis have argued that it is indeed possible to predict at least some types of linguistic change. In his study of language universals, Joseph Greenberg (1966) has argued that other things being equal, language change, when it occurs, can be predicted from statistical or implicational universals. For example, if almost all languages have at least one nasal consonant (e.g., /n/ or /m/), we would predict that any language *lacking* such consonants would be likely to develop one before it develops other consonantal distinctions. In my own study of language function (Baron, 1981), I have demonstrated that change in such formal linguistic properties as degree of syntactic redundancy or levels of iconicity in sign formation can accurately be predicted from a social profile of the linguistic community.

A third predictive approach to language change is based upon the study of contemporary language variation. Beginning with the Prague School of the late 1920's (Vachek, 1966) and extending to William Labov's contemporary studies of phonological variation (Labov, Yaeger, and Steiner, 1972), the

sociolinguistic tradition has demonstrated that the new linguistic variants of yesterday often become the linguistic norm of today. Therefore, by observing contemporary variation, it is possible to make reasonable predictions about the linguistic future.

Predicting the future is always risky. In real life other things are seldom equal, so there is always the strong possibility of being wrong. However, such risks are worth taking if some outcome hinges upon the prediction. In the present context, that outcome is the expressive power and functional range of traditional spoken and written English. If computer mediated communication does influence the way we speak and write, then the ability to predict change (rather than merely observe it in retrospect) may prove critical if we wish to contemplate doing anything about it.

Descriptivism versus Prescriptivism

To speak of “doing anything about” language is to reopen a long and bitter debate in the annals of linguistic history: Is the task of the linguist to “describe” language precisely as he finds it, or to work towards changing language to fit a normative model?

Since at least the early eighteenth century, Europe had focused much of its linguistic attention on “correct” language. The French and German governments directly oversaw the “purity” of their respective national languages, and England, with its rising middle class that needed tutoring in the polite speech of the gentry, became obsessed with the “doctrine of correctness” (Leonard, 1929).

This same attitude towards “correctness” in language was extended by missionaries and explorers who encountered strange peoples speaking even stranger languages. In almost all instances the Europeans assumed Latin grammar as the appropriate model for trying to understand these exotic non-European languages. Needless to say, the resulting grammars ended up characterizing these languages as radically defective, and similar inferences were typically drawn about the mental abilities of their speakers (see Hanzeli, 1969; Baron, 1981).

Rebelling against these “prescriptive” models of American Indian languages, Franz Boas set out to look at the languages in their own right. In so doing he hoped to establish that indeed these languages were highly sophisticated (rather than defective) and, derivatively, that their speakers must be culturally sophisticated as well (Boas, 1911; Herskovitz, 1953).

Boas and his students accomplished their task. In the process they also established an American tradition of descriptivism—a tradition that eschewed all attempts at evaluating languages with respect to one another, and a tradition that had little patience for doctrines of correctness. This commitment to descriptivism over prescriptivism was underscored in the 1960’s by the

publication of *Webster's Third New International Dictionary*, which abandoned notations of formal and informal style, and introduced not only *ain't* but a range of other four letter Anglo-Saxon words as well. And in recent years, American students of language have typically rejected the efforts of such language "purists" as Edwin Newman (1974), William Safire (1980), and John Simon (1980) (see Nunberg, 1983, for a review of the contemporary debates).

Against such a linguistic backdrop in America, it is uncharacteristic to pose the question of whether the influence of one linguistic modality upon another is a good thing or bad. Yet this is precisely the question that I suggest we need to be asking about the possible influences of computer mediated communication upon speaking and writing. Is there any justification for even contemplating a prescriptive approach to cross-modal influences? I suggest that there is, although the arguments cannot be constructed on strictly linguistic grounds. Rather, justifications are more properly sociological.

Consider the scenario (admittedly wildly unlikely) that traditional spoken and written language come to have the precise linguistic character we have described for computer conferencing (see Figure 6 above). What implications would such linguistic change have for the functioning of human social interaction?

To begin with, human language would lose the majority of its functions. It is commonly acknowledged by language theorists (Bühler, 1934; Jakobson, 1960), anthropologists (Hymes, 1964), and philosophers of language (Austin, 1965; Searle, 1969) that the exchange of "objective" information is but one of the many functions that human language can serve. Most of the time we use language as a medium of *social* rather than informational exchange. Our language serves to convey our attitudes about ourselves or towards others. We use language to conceal or convince. Language is a means of accomplishing goals ("I hereby christen this ship") or of preventing action ("Don't!"). Even when we are ostensibly exchanging information ("I'm fond of spring in Atlanta"), our actual purpose may be to make the acquaintance of the person standing near us at the bus stop. As we have seen, computer mediated communication — at least as currently used — is ill-suited for such "social" uses of language.

Second, computer mediated communication may serve to discourage actual human encounters. Much as the Lynds observed that "neighboring" declined with the rise of the telephone in Middletown, observers of computer mediated communication have begun to notice scenes such as the following: "At our laboratory people have come to rely on their terminals, and sometimes seem to prefer electronic messages to conversing face-to-face. It is not unheard of for one person to see another in the hall and to say, 'I am going to send you a message,' and then go do so, forgetting that the information could have been easily conveyed then and there" (Norman, 1983:49).

The scene is strangely reminiscent of communication in a society imagined by Isaac Asimov in *The Naked Sun*. On the world known as Solaria, inhabitants almost never “saw” one another. Instead they “viewed” their interlocutors through a system of electronic communication much like videophones or teleconferencing. When force of circumstances actually brought two people physically together into the same location (such as occasional meetings between husbands and wives, or between doctors and patients), both parties were acutely uncomfortable.

Third, while computer mediated communication may be a boon for democracy, it may unwittingly undermine the basic social fabric that any society — including a democracy — needs to survive. Social distinctions based upon familial or social standing (such as respect for elders or for elected leaders) seems to be at odds with the prevailing linguistic consequences of computer mediated communication.

And fourth, the profusion of computer mediated communication would seem to challenge some of the very bases upon which human beings formulate their beliefs. The rhetorical tradition of persuasion would be supplanted by strict logical argumentation. It is unclear how the bias against “soft” information in computer mediated communication might affect our ability to talk about patriotism or charisma or religious belief.

In our hypothetical scenario, such are the kinds of social effects that cross-modal linguistic influence might have. It is in light of such possibilities — however extreme or however remote they might seem — that I venture into the murky domain of linguistic prediction and evaluation.

Cross-Modal Influence Redux: Computers, Speech, and Writing

And now for the crystal ball: Given what we have learned about cross-modal linguistic influence (in Part I) and about computer mediated communication (in Part II), what kinds of influence might we predict that computer mediated communication could have upon traditional speech and writing?

In making these predictions, it is useful to employ some new terminology that summarizes a number of the linguistic variables we have been discussing throughout the paper. I will use the term *vertical language* to refer to the use of language for logical sequencing. Vertical language is well suited for conveying “objective” information and for establishing logical connections between points. I will use the term *horizontal language* to refer to the use of language for description. Horizontal language is useful in expressing nuance, making subtle (or stylistic) distinctions, and more generally, using linguistic and non-linguistic context for crafting a gestalt.

Given these distinctions, we can now consider a simplified “map” of the potential influences that computer mediated communication might have upon spoken and written language. Figure 8 is organized in terms of a time line. Beginning at the left side of the figure, we see that even before the computer

became a relevant variable in human communication, spoken English was having an increasing effect upon the way educated language users formulated written English. With the introduction of computer mediated communication, we then encounter a slightly convoluted set of influences: On the one hand, because computer mediated communication—like typing more generally—is physically a form of writing, we assume that computer mediated communication is directly affected by norms of written language (e.g., punctuation, the need for grammatical sentences). On the other hand, since writing itself is increasingly affected by speech, we should not be surprised to find spoken language conventions imposing themselves as well on computer mediated communication (e.g., contractions, less formal vocabulary and syntax).

But then what? What effect might we predict for computer mediated communication upon future speech and writing? Consider first the case of speech.

If spoken language is indeed influenced by computer mediated communication, we might expect to see an improvement in the vertical

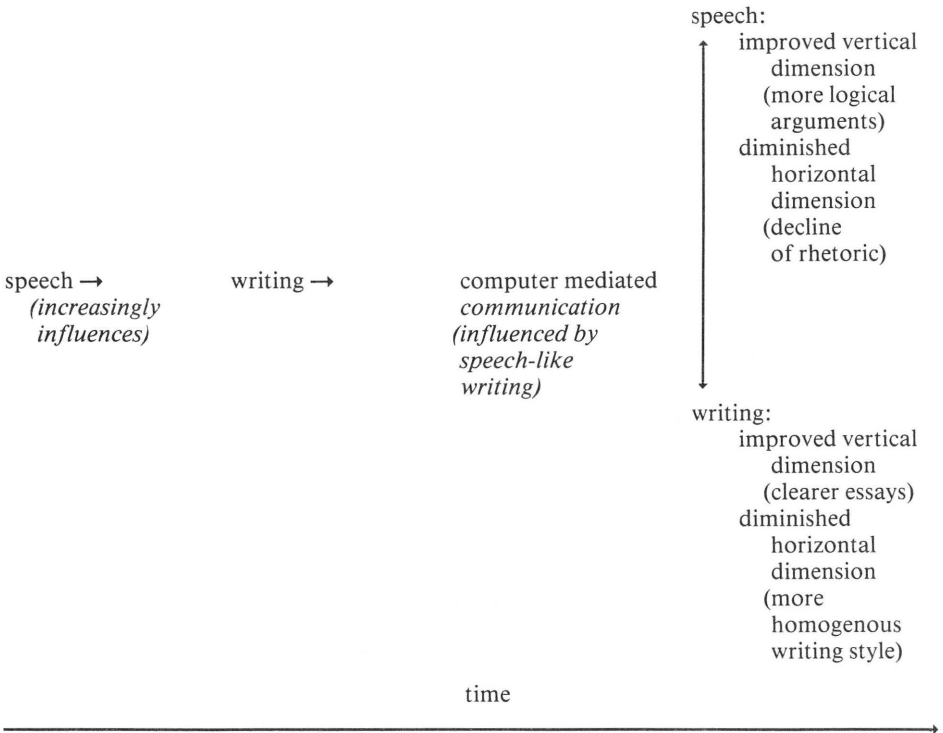


Figure 8. Potential influences of computer mediated communication on speech and writing.

dimension of speech. That is, the degree of logical coherence and grammaticality in our speech might begin to approximate more closely that of our written language. To borrow an image we used earlier in Figure 3, a growing number of us might develop a version of "professorial speech." At the same time, though, we would predict a diminution of the horizontal dimension of speech. Rhetorical skills (that have steadily been on the decline in America for almost a century) would continue to atrophy, since "objective" data are more successful in computer mediated communication than verbal suasion.

The written language would follow a very similar course if influenced by computer mediated communication. The vertical dimension would improve and the horizontal dimension would decline. Word processors, as we have seen, encourage revision. But the revision is more likely to be along the lines of logical coherence than stylistic richness. The result could be a more homogenous norm for "acceptable" writing that is clear but stylistically uninteresting. The recent development of grammar and style programs such as Writer's Workbench from AT&T Bell Laboratories may serve to hasten this already existing potential for increased homogeneity (Cherry and Macdonald, 1983).

There are few moments in human history when technological innovation has the potential for radically altering human society within the space of a generation. It is generally agreed that the computer has produced one of those moments. Our goal in this paper has been to explore the place of human language in this revolution. We have considered computer mediated communication as a new linguistic modality in its own right, and then contemplated how computer mediated communication might affect the existing forms and functions of spoken and written language.

No one in the computer industry has any hidden agenda for using hardware or software development to alter human language. Yet technology can indeed drive linguistic and social change. On Asimov's world Solaria, inhabitants did at one time physically "see" one another. But changing circumstances made that unnecessary. Because the population of Solaria was small, it was possible for inhabitants to develop large landed estates. And on a large estate, there is little likelihood of encountering one's neighbor. A Solarian sociologist described it this way: "A Solarian takes pride in not meeting his neighbor. At the same time, his estate is so well run by robots and so self-sufficient that there is no reason for him to have to meet his neighbor. The desire not to do so led to the development of ever more perfect viewing equipment, and as the viewing equipment grew better there was less and less need ever to see one's neighbor. It was a reinforcing cycle, a kind of feed-back" (Asimov, 1957:100).

What our future language will actually look like remains to be seen. What, if anything, we wish to do about it remains for us to decide.

References

- Asimov, Isaac (1957). *The Naked Sun*. Garden City: Doubleday.
- Austin, J.L. (1965). *How to Do Things with Words*. New York: Oxford.
- Ball, Donald W. (1968), "Toward a Sociology of Telephones and Telephoners," in Marcello Truzzi, ed., *Sociology and Everyday Life*. Englewood Cliffs (N.J.): Prentice-Hall.
- Baron, Naomi S. (1979), "The Functions of Cross-Model Representation," *Proceedings of the XIIth International Congress of Linguists*, Vienna, 727-730.
- Baron, Naomi S. (1981). *Speech, Writing, and Sign*. Bloomington: Indiana University Press.
- Basso, Keith (1974), "The Ethnography of Writing," in Richard Bauman and Joel Sherzer, eds., *Explorations in the Ethnography of Speaking*. New York: Cambridge University Press, 425-432.
- Bloomfield, Leonard (1933). *Language*. New York: Holt, Rinehart and Winston.
- Boas, Franz (1911), "Introduction," *Handbook of American Indian Languages*. Washington: Government Printing Office.
- Bühler, Karl (1934). *Sprachtheorie*. Jena: Gustav Fischer.
- Cherry, L.F., and Macdonald, N.H. (1983), "The Unix Writer's Workbench Software," *Byte*, 8, 241-248.
- Chomsky, Noam (1965). *Aspects of the Theory of Syntax*. Cambridge (Mass.): MIT Press.
- Clancy, Patricia M. (1982), "Written and Spoken Style in Japanese Narratives," in Deborah Tannen, ed., *Spoken and Written Language*. Norwood (N.J.): Ablex, 55-76.
- Eisenberg, Jane, and Jeffrey Hill (1984), "Using Natural-Language Systems on Personal Computers," *Byte*, 9 (no.1) :226ff.
- Greenberg, Joseph, ed. (1966). *Universals of Language*. Cambridge (Mass.): MIT Press.
- Grossman, Jerome H., G. Octo Barnett, Michael T. McGuire, and David B. Swedlow (1971), "Evaluation of Computer-Acquired Patient Histories," *JAMA*, 215 (no.8): 1286-1291.
- Hanzeli, Victor Egon (1969). *Missionary Linguistics in New France*. The Hague: Mouton.
- Harris, Larry R. (1983), "A New Dimension in Software," *Computerworld Buyer's Guide: Software*, December: 10-16.
- Herskovits, Melville (1953). *Franz Boas*. New York: Charles Scribner's Sons.
- Hiltz, Starr Roxanne (1984). *Online Communities*. Norwood (N.J.): Ablex.
- Hiltz, Starr Roxanne, Kenneth Johnson, Charles Aronovitch, and Murray Turoff (1980), "Face-to-Face vs. Computerized Conferences: A Controlled Experiment," Computerized Conferencing and Communications Center, New Jersey Institute of Technology, Research Report Number 12.
- Hiltz, Starr Roxanne, and Murray Turoff (1978). *The Network Nation*. Reading (Mass.): Addison-Wesley.
- Hudson, R.A. (1980). *Sociolinguistics*. Cambridge: Cambridge University Press.
- Hockett, Charles F. (1965), "Sound Change," *Language*, 41:185-205.
- Hymes, Dell, ed. (1964). *Language in Culture and Society*. New York: Harper and Row.
- Hymes, Dell (1974). *Foundations in Sociolinguistics*. Philadelphia: University of Pennsylvania Press.
- Jakobson, Roman (1960), "Closing Statement: Linguistics and Poetics," in Thomas A. Sebeok, ed., *Style in Language*. Cambridge (Mass.): MIT Press, 350-377.

- Kerr, Elaine B., and Starr Roxanne Hiltz (1982). *Computer-Mediated Communication Systems*. New York: Academic Press.
- Kiesler, Sara, Jane Siegel, and Timothy W. McGuire (in press), "Social Psychological Aspects of Computer-Mediated Communication," *American Psychologist*.
- Kiesler, S., D. Zubrow, A.M. Moses, and V. Geller (Ms.), "Affect in Computer-Mediated Communication," Carnegie-Mellon University.
- Kroll, Barry M., and Roberta J. Vann, eds. (1981). *Exploring Speaking-Writing Relationships*. Urbana: National Council of Teachers of English.
- Labov, William, M. Yaeger, and R. Steiner (1972). *A Quantitative Study of Sound Change in Progress*. Report on National Science Foundation Contract NSF-GS-3287. 2 vols. Philadelphia: The U.S. Regional Survey.
- Leonard, Sterling (1929). *The Doctrine of Correctness in English Usage 1700-1800*. *University of Wisconsin Studies in Language and Literature*, number 25.
- Lester, David (1977), "The Use of the Telephone in Counselling and Crisis Intervention," in Ithiel de Sola Pool, ed., *The Social Impact of the Telephone*. Cambridge (Mass.): MIT Press.
- Li, Charles N., and Sandra A. Thompson (1982), "The Gulf Between Spoken and Written Language: A Case Study in Chinese," in Deborah Tannen, ed., *Spoken and Written Language*. Norwood (N.J.): Ablex, 77-88.
- Lynd, Robert, and Helen Lynd (1928). *Middletown: a Study in Contemporary American Culture*. New York: Harcourt, Brace.
- Nash, Jeffrey E., and Anedith Nash (1982), "Typing on the Phone: How the Deaf Accomplish TTY Conversations," *Sign Language Studies*, 36:193-216.
- Newman, Edwin (1974). *Strictly Speaking*. Indianapolis: Bobbs-Merrill.
- Norman, Donald (1983), "The Computer Always Rings Twice," *Psychology Today*, 17 (no. 10):46-50.
- Nunberg, Geoffrey (1983), "The Decline of Grammar," *Atlantic*, 252 (Dec.): 31-46.
- Ong, Walter (1982). *Orality and Literacy*. Methuen: New York.
- Reid, A.A.L. (1977), "Comparing Telephone with Face-to-Face Contact," in Ithiel de Sola Pool, ed., *The Social Impact of the Telephone*. Cambridge (Mass.):MIT Press, 386-414.
- Safire, William (1980). *On Language*. New York: Times Books.
- Searle, John (1969). *Speech Acts*. Cambridge: Cambridge University Press.
- Shortliffe, Edward H. (1980), "Consultation Systems for Physicians: The Role of Artificial Intelligence Technologies," *Proceedings of the Canadian Society for Computational Studies of Intelligence (CSCSI)*, University of Victoria, B.C.
- Siegel, Jane, Vitaly Dubrovsky, Sara Kiesler, and Timothy W. McGuire (Ms.), "Group Processes in Computer-Mediated Communication," Carnegie-Mellon University.
- Simon, John (1980). *Paradigms Lost*. New York: C.N. Potter.
- Slack, Warner V., G. Philip Hicks, Charles E. Reed, and Lawrence J. Van Cura (1966), "A Computer-Based Medical-History System," *New England Journal of Medicine*, 274 (no. 4): 194-198.
- Sproull, Lee S., Sara Kiesler, and David Zubrow (in press), "Encountering an Alien Culture," *Journal of Social Issues*.
- Stubbs, Michael (1980). *Language and Literacy*. London: Routledge and Kegan Paul.
- Tannen, Deborah, ed. (1982a). *Analyzing Discourse: Text and Talk*. Washington: Georgetown University Press.
- Tannen, Deborah, ed. (1982b). *Spoken and Written Language*. Norwood (N.J.): Ablex.
- Vachek, Josef (1966). *The Prague School of Linguistics*. Bloomington: Indiana University Press.
- Zuboff, Shoshana (1982), "New Worlds of Computer-Mediated Work," *Harvard Business Review*, 60:142-152.