

*An important element of written and other technological forms of communication is that they accommodate "distance" between sender and receiver in a way proximate communication does not. Despite its importance, the notion of distance has remained pretty much undeveloped in theories of written communication, and the reference points for developing it have remained scattered across various, often noninteractive, literatures such as social theory, network theory, knowledge representation, and postmodernism. Synthesizing across these diverse literatures, we formulate a set of concepts and axioms that lays down some baselines for the general communication context, proximate or at a distance. Our baseline concepts include, among others, relative similarity, signature, reach, and concurrency. We then move beyond these baselines to concepts and axioms that accommodate the specialized distance characteristics of written (also print and electronic) communication. These concepts include asynchronicity, durability, and multiplicity. We conclude by discussing how these concepts and axioms matter to (a) the theoretical modeling of proximate and written systems of communication (including print and electronic systems); and (b) the educational challenge of teaching communication at a distance in the proximate space of the writing classroom.*

# *Some Concepts and Axioms About Communication*

## *Proximate and at a Distance*

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*Written communication is a form of technology commonly thought to have been superseded by print and, more recently, electronic communication. Yet in reality print and electronics have only proliferated, not reduced, contexts for writing (Bolter, 1991; Kaufer & Carley, 1993). Moreover, written communication was the first technology to introduce, in systemic terms, what print and electronics could only extend—the idea of distance in communication. Distance indicates the writer's separation from a reader in space, time, culture or some mix thereof.*

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In comparison to simple writing systems, print and electronics have extended the potential of this separation on all three dimensions. Yet the potential begins with writing and, as a result, to understand written communication in fundamental terms, the first order of business, it seems, would be to understand, systematically, how written communication accommodates distance.

Curiously, this agenda, in the systematic form just indicated, has yet to be set. To be sure, the potential of distance in written communication has been widely addressed in the literature. Yet it has been addressed only in piecemeal fashion—only in ways that (too often) mistake distance for the “higher” technologies of print and electronics; and across specialties that possess strikingly noncompatible languages, histories, methods, and approaches. For example, in the world of commerce, publishers daily confront the problem of distance when they must decide on the choice of audience for an author’s proposed text or for a series of texts. Demographically, what readers should an author’s text seek to engage? The question has little meaning in face-to-face encounters. It is only the implicit assumptions of distancing in written communication that make the concern of locating an audience something more than incidental.

Deciding on a reader is not the only concern raised by distance. Other specialists have pursued the implications of distancing in writing through such questions as: What actually happens in the act of literate exchange? How is it possible to arrive at shared meaning in the face of distance, when a reader has no person but only a text (a surrogate person flattened to two dimensions!) with which to interact? Composition and reading researchers, along with literary and rhetorical critics, have focused on answers to this second set of questions. Nystrand (1986, 1989), Brandt (1989, 1990), White (1984), and Mailloux (1989) have independently developed interesting accounts of the “distance” of exchange separating authors and readers. They have, in different but complementary ways, suggested how acquiring literacy involves learning how to adjust to and, to a certain extent, compensate for the inherent distance involved. Working in educational contexts, Nystrand and Brandt have studied the coordination skills that students must learn in order to overcome their separations in time and space with contemporary authors. Working in literary and historical contexts, White and Mailloux have theorized about the reader’s long-distance relationship with authors separated in time and culture. White is particularly impressed with how engaging

authors of other times and cultures (from Homer to Edmund Burke) can increase our capacity to reflect on our own cultural boundedness as meaning makers. Mailloux focuses on how readers regularly rely on recent or remote texts as resources to address hotly debated issues in their own time and place; how, for example, persons on different sides of the debate on racism and juvenile delinquency turned, for decades after its 1884 publication, to "Huckleberry Finn" as a resource to plead their side of the argument.

These various investigators have each contributed extremely useful insights toward our understanding of communicative distance when it is assumed that a reader has already selected and is currently occupied by a text. Yet none addresses the prior decision making that motivates individuals to choose a long distance partner who can only be "read" rather than "addressed." Nor do these researchers address a third, independent set of issues raised by distance, one involving the larger adaptive consequences of oral and literate behavior. The fact that written communication has the capacity of distance also means that its short- and long-term consequences can have, potentially and relative to face-to-face communication, a concentrated impact on a historically and geographically dispersed "group" of individuals, whose identity as a group is based, in whole or part, on its members having commonly interacted with the same text or (in the case of manual copying, print, or electronics) different copies of the same text.

Researchers who have done the most to investigate the consequences of face-to-face as well as literate communication are strange bedfellows indeed: diffusion theorists in social science departments and postmodernists in humanities departments. In light of the obvious methodological problems of tracking the effects of "interactions" running concurrently and through time, both schools tend to make highly idealizing assumptions in order to make their projects more tractable. Diffusion theorists tend to make mathematical assumptions that suppress issues of distance in choosing partners and negotiating meaning with them. Typically interested in the spread of a simple and undifferentiated message (e.g., the existence of a disease, a vaccine, or a technology), diffusion theorists tend to reduce the decision making that goes into choosing a partner to "proximity in a social network." They further tend to reduce the content of a communication, oral or literate, to a simple and unchanging meaning as it moves from one context to another (Rogers, 1982). That is to say, the mathematical models typically in use among such theorists offer no explicit formal-

isms for representing the reality that a communication (spoken or written) is decomposable into many components, any of which can be lost or newly elaborated across transactions (Rogers, 1982). Indeed, this is the very reality that makes the negotiation of meaning *necessary*. Diffusion theorists thus tend to study the over-time trajectory of communications, but only by abstracting away the problems of distance as they arise in choosing interaction partners and negotiating meaning with them.

Postmodernists in the Derridean (1976) tradition rely not on mathematical abstraction but upon philosophical apriorisms and, in some cases, the fallacy of composition to ground their theories of social communication. Derrideans tend to posit (as a first principle) the inherent *instability* of meaning as it is negotiated across persons and between persons and texts. Derrideans interested in social and political theory then proceed to project the consequences of this (local) instability on the aggregate shape of the larger society in which these local interactions take place. This projection, however, commits the fallacy of composition, falsely assuming that aggregate and over-time effects on patterns of interaction follow directly and immediately from local patterns. The relationship between part and whole, between local and over-time interaction, is not necessarily direct and immediate. Spouses whose communications constantly misfire can nonetheless remain in a stable (perhaps unhappy) relationship over time. Countries that are poles apart in language, history, and ideology nonetheless can continue to approach one another in a stable relationship. From snapshots of single interaction situations, one can make no firm predications about the aggregate and over-time trajectory of that situation. This is because what happens to any single interaction situation over the long run depends on what is happening within interaction situations going on concurrently. What happens between the spouses over time depends, in part, on what is happening at the same time in other relationships. What happens between the United States and Russia over time depends, in part, on what is happening between Japan and Russia and between Japan and Germany. Social Derrideans bring no theory of concurrency or adaptive over-time behavior to legitimate how they get from their stipulation of instability at the level of local interaction to their projection of macroinstability. They are thus not warranted in assuming that social structures and cultural norms are "flipped" according to the same mechanisms in

which an individual reader, working locally and answerable to no one else, can flip an accepted reading of Shakespeare.

Diffusion theorists and postmodernists have thus both addressed issues of distance associated with the aggregate and over-time consequences of oral and literate communication. Yet in doing so, both reduce or elide distancing issues as they arise in the choice of an interaction partner and in the negotiation of meaning with him, her, or it. Diffusion theorists, more specifically, have factored out the potential instability of negotiated meaning; postmodernists have factored out its potential stability and, in some cases, have made unwarranted projections from the putative instability of local interaction to instability at the aggregate level.

To sum up the discussion thus far, the literature addressing the distancing assumptions of written communication spirals outward across seemingly incommensurable perspectives and agendas. The purpose of this article is to address the distancing potential of written communication from a unified framework, a framework that integrates distancing assumptions as they arise in the choice of an interaction partner, in the negotiation of meaning with that partner, and in the larger adaptive consequences as multiple interactions aggregate concurrently and over time.

We shall begin our considerations with a baseline that is indifferent to whether the communication is oral or literate. This baseline will include concepts that function as building blocks to written communication and, more generally, communication at a distance: *relative similarity*, *mental models*, *signature*, *reach*, and *concurrency*. These concepts are necessary for an account of written communication but, taken together, they do not yet constitute the various assumptions of distancing we associate with communication in writing, print, or electronics. We then introduce further concepts that do circumscribe the distancing assumptions of written (as well as print and electronic) communication. These later concepts include *asynchronicity*, *durability*, and *multiplicity*. We next go on to describe some of the theoretical implications of modeling proximate and long-distance communication. We finally relate one result from our own theoretical modeling (Kaufer & Carley, 1993) to the educational challenge of trying to teach the distancing potential of written communication in the proximate space of the writing classroom.

## THE GENERAL CONTEXT OF COMMUNICATION: PROXIMATE OR DISTANT

### Individuals and Social Systems

Individuals can be viewed as actors within a system. Such a view is not novel and occurs in the work of many social theorists and social scientists (Foucault, 1977; Giddens, 1984). What differs among social theorists is the meaning of saying that individuals are involved, or even constituted, within systems. Unlike some anticognitivist social theorists (like Foucault), we place a cognitive as well as a social interpretation on this meaning. Individuals have sociality in part because of their cognitive architecture. That is to say, individuals have a built-in acquisitive habit. They have an ongoing project to learn more about their world, to increase their knowledge of it, and it is this project that drives their desire for communication and sociality. Furthermore, the causality is not one way because, without sociality and the capacity to interact with other minds, individuals would be deprived of the knowledge their minds bequeath them the capacity to acquire. Such continual learning, it should be acknowledged, is hardly the exclusive motivation for communication. As we experience the world, many if not most of our motives for communication seem instrumental and ephemeral. Often we just want to know what tool to use to fix the sink, and when we ask the clerk at the hardware store, our learning is over. There are times, further, when we would like to shut out the world and learn nothing at all. Yet our acquisitive habit is the fundamental and ongoing project we have as communicators. Other things being equal, our acquisitive habit is a very self-interested and a relatively low-effort one for, in a complex culture, interacting with others (face-to-face, through texts, electronics, or celluloid) is a self-interested and low-effort way to learn about the world. For example, it requires less effort than trying to learn directly from nature, where individuals cannot reflect upon the experiences of others to prefigure their own.

Because of our acquisitive habit and because acquisition is as much a by-product of interaction as cognition, our view of individuals as systemic simply means that to understand the individual, one must set knowledge and interaction as coequal primitives. One cannot define individuals only through their cognition (that would be naive

cognitivism) nor only through their position within a social system (that would be naive social constructionism). Both sides of the equation are needed to understand the individual's project of acquiring knowledge. These sides of the equation are balanced for us in our first axiom, the axiom of reciprocity.

**AXIOM 1: TO UNDERSTAND THE INDIVIDUAL,  
ONE MUST UNDERSTAND THE RECIPROCITY  
BETWEEN INDIVIDUAL COGNITION  
AND SOCIAL INTERACTION**

The axiom of reciprocity simply says that what you know makes a difference with whom you are likely to interact. Whom you interact with, furthermore, will likely make a difference in what you know. Knowledge and interaction are reciprocally related to one another. Changes in knowledge both condition and are conditioned by changes in interaction and vice versa. All individuals try to make the reciprocity between their cognition and their patterns of interaction work for them in light of their ongoing project to acquire knowledge about the world. At any time, individuals can view their knowledge acquisition project from the side of cognition or from the side of interaction. But whatever the starting point of their viewing, they are inevitably led to the other pole before much of their learning project can get off the ground. Social interaction supplements an individual's cognition, and cognition is required for an individual to retain a memory of what he or she has learned in interaction. In short, knowledge and cognition are reciprocally related to social interaction.

The axiom of reciprocity is different, yet complementary, to Nystrand's (1986, 1989) axiom. For Nystrand, reciprocity is a principle of how writers and readers overcome distance as they negotiate meanings and how they learn to make adjustments in their understandings when some of their tacit assumptions are ostensibly violated (also see Grice, 1973). Our reciprocity axiom is designed as a broader principle needed to animate the entire mechanism through which interaction partners are selected, meanings negotiated, and then adaptations made across an aggregated set of concurrent and over-time interactions. In light of its broader focus, our notion of reciprocity is also modality independent, describing the dynamic underlying communication independent of the "mode" in which the information in the interaction is delivered.



We have made the assumption that, other things being equal, individuals try to be self-interested and expend low effort in their habits of acquisition. Let us now consider how the axiom of reciprocity is designed in part to capture these assumptions of self-interest and low effort in one's learning regimen. First, let us suppose that, for individuals to learn, they need to relate new information to what they already know. It follows that the more they already know about a topic, the more points of connection they can make between their knowledge and incoming information from outside sources (e.g., persons and texts) about it; and so it follows that, to be self-interested and to expend low effort in learning new things, individuals should carry out learning projects on topics where they can already boast some accumulation of learning. Second, it follows that, to be self-interested and expend low effort in learning new things about a topic, individuals are rational to interact disproportionately often with partners who know something about the topic (and often who know more than the inquiring individual).

If self-interested and low-effort learning is an impetus for one half of the reciprocity axiom—that shared knowledge facilitates interaction—it is also a by-product of the second half—that interaction facilitates shared knowledge. The second half of reciprocity is a truism: The more people interact, the more knowledge they have in common. And according to the reciprocity axiom, if they continue to have enough in common, over time, to support self-interested and low-effort learning, they will (probably) continue to interact with one another relative to other possible partners. Reciprocity of knowledge and interaction, it should now be seen, follows from the assumption that, other things being equal, individuals in a social system want to make their ongoing project of knowledge acquisition effective.

### Relative Similarity

Let us now get more specific about how an ongoing project of knowledge acquisition can be made effective, given the tendency of human agents to be self-interested and to seek low levels of effort in their learning. Other things being equal, knowledge acquisition will be more effective when individuals in a social system choose, for interaction, partners who are more cognitively similar to themselves than they are to any other available partners for interaction. This suggests that, in their need to satisfy the acquisitive habit with little

effort, individuals are likely to choose interaction partners according to the rule of relative similarity. An example of relative similarity-based interaction is the informal networks in science that make up what Crane (1971) called "invisible colleges." In science, problem-oriented specialties arise as scientists find their work relatively similar enough to become elaborators of, as well as collaborators on, one another's research. Crane reports that there is within science "an interaction between cognitive events and social events in the development of a research area" (pp. 77-79), and that with the increase in the perception of similar conceptual problems comes an increase in social interaction.

As its name suggests, relative similarity is not the same as similarity. Individuals do not interact on some absolute metric of similarity; rather, they are more likely to interact at a particular time with some other if they think, at that time, they have more cognitive similarity with that other relative to all others who are currently available for interaction. The social and psychological bases for this principle are discussed at length in Carley (1990, 1991), who examines this proposition more formally. A form of this proposition is offered in Axiom 2 below.

**AXIOM 2: THE MORE RELATIVELY SIMILAR  
AN INDIVIDUAL PERCEIVES HIMSELF  
OR HERSELF TO ANOTHER, THE MORE  
LIKELY THE INDIVIDUAL IS TO ATTEMPT  
INTERACTION WITH THAT OTHER**

There are aspects of this axiom that merit elaboration. First, this is a statement about the likelihood of interaction and not a deterministic statement about who interacts with whom. Second, this axiom does not imply that relative similarity is the only decision-making principle underlying interaction, merely that it is an important one because it best explains what motivates interaction when the interaction is meant to satisfy one's ongoing acquisitive habit to learn about the world with little effort. (We will return to this point later when we discuss other motivations for interaction.) Third, this axiom makes use of perceived relative similarity and not actual relative similarity. An individual cannot perceive himself or herself as similar to another unless the other is already known to the individual. Fourth, interaction based on relative similarity may be asymmetric. For example, just

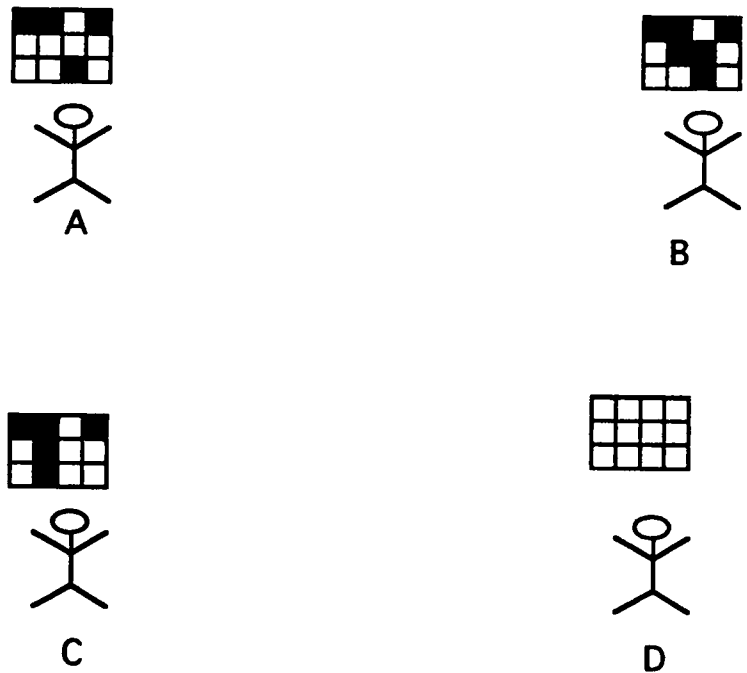


Figure 1: An Example of Relative Similarity-Based Interaction

because an individual D decides to interact with A on the basis of relative similarity (given a candidate list of persons B, C, E whom D passed over in preference for A) does not mean that B will also target A as the most relatively similar. Relative similarity makes possible nonreciprocal relationships. Figure 1 illustrates this asymmetry when knowledge is the only factor.<sup>1</sup> For simplicity, assume that an individual's knowledge can be displayed as black or white positioned squares in a rectangle containing 12 squares. A match in knowledge requires that any two individuals have both black at the same positioned square or both white. Now consider the knowledge of four individuals, A, B, C, and D, members of the same interactive community.

Assume that D wants to communicate something. Relative similarity says that D will target individual A because D is most relatively similar to A in terms of knowledge. (They match on 8 squares; whereas D's match to B is only 6 squares and his or her match to C, only 7.) Yet, A perceives D to be least relatively similar to him or her in comparison

to B and C because A's match with B is 10 squares and with C, 9 squares. This means A's propensity to interact with D is quite different from D's to interact with A. Interaction based on relative similarity captures the common intuitions that bids to interact are not symmetric, that two individuals do not necessarily have the same propensities to interact with one another, and that the description of their interaction must take into account other possible individuals and potential interactions in the social context as a whole. Axiom 2 is thus also designed to handle the fact that individuals interact within a competitive context that involves a description of the knowledge and interaction probabilities of other agents.

### *Additional Motivations*

Relative similarity is not the only motivation for interaction. Other motivations include, but are not limited to, coercion, difference, and the maintenance of social relationships. For example, communicators can be coerced into interaction through power relationships. While coercion can sustain interaction in the short term, it is less likely to sustain it in the long run precisely because it is not a strong enough principle to sustain the acquisitive habit over time. A student can be coerced to write a term paper but not to become a scholar. In the 19th century, various efforts by Methodists and Benthamites to enforce reading through "good" literature (Altick, 1957) failed because of the general failure of coercion to support reading habits over the long term. Coercion also describes social interaction in organizations where institutional controls from hierarchies dominate more individually spawned relative-similarity relationships within teams. But there is long-established evidence (Roethlisberger & Dickson, 1939) that institutional controls that are too coercive, that stifle relative-similarity relationships among workers do not work as effectively (in terms of worker performance) as controls that allow workers more space to satisfy their natural acquisitive habits.

Individuals may often consult persons who are low on relative similarity, but who nonetheless have a specialized piece of information to offer (e.g., the salesperson at the hardware store, the librarian at a reference desk). In these cases, it is the specific difference in expertise between the individuals that brings them to interact, not their relative similarity. While difference accounts for interaction in many voluntary professional-client engagements, these encounters

are relatively sporadic and short term in comparison to the interactions that satisfy an individual's ongoing acquisitive habit. In addition, in the majority of contexts, difference does not compete with relative similarity but provides an additional heuristic for individuals who are impelled to decide on interaction partners through relative similarity and who want to work even more effectively than they could work through relative similarity alone. Specifically, individuals out to satisfy their acquisitive habit use differences heuristically to home in on "what's new" in the person (or text) with whom they are interacting (Young, Becker, & Pike, 1970). Readers use difference to define reader-specific goals (cf. Flower, 1988) that allow them to discover whether a text that already shares many of their acquisitive interests can offer them exactly what they do not yet know and are looking to find out.

Individuals also interact to maintain relationships. Some of this interaction is driven by relative similarity, but we can also imagine some of it driven merely by the need to belong or be accepted. Altick's (1957) history of literary clubs in the 19th century suggests that such clubs were of both kinds. Some clubs were organized as voluntary groups who read books in common in order to reinforce and extend what was already a substantial set of shared interests. Other clubs were formed by edict and individual members, widely disparate in education and interests, were asked to read the same books in order to give them a sense of common belonging to the prestige culture. The first set of clubs had a longer and happier life than the second. Gere (1987) comes to a similar conclusion in her historical study of writing groups in the 19th-century curriculum. While it is the case that interaction often serves the goals of forming and maintaining relationships, the prospects of this process going on continuously and for the long term is much higher when the members of the relationship share the same acquisitive habits.

To sum up, while relative similarity is not the only motivation for interaction, it is the most promising principle for explaining the force behind our long-range acquisitive habits and our interest in carrying out these habits relatively effectively and yet in least effortful ways. Coercion, difference, and relationship maintenance are other possible mechanisms. But each of these alternatives is either too weak or logistically requires too much effort to sustain a continuous and long-term acquisitive habit. These alternatives may be better explained as adjuncts to, rather than strict competitors of, relative similarity.

### **Mental Models**

The regularity of relative similarity as a mechanism for selecting interaction partners presupposes that humans are able to use their cognition to model the world outside themselves. Such modeling is essential for individuals if they are to make estimates of their relative similarity with potential interaction partners in their environment. When individuals judge relative similarity, they are judging the meanings to which individuals associate their historical experience. Individuals who perceive themselves as highly similar will also perceive that they see events much in the same way and that they share these perceptions because they share a language and a set of histories through which they also perceive the world. The internal systems through which individuals are able to represent language, meanings, and histories to themselves (Carley & Kaufer, in press; Kaufer & Carley, in press)<sup>2</sup> are called mental models. The notion of human agents using mental models to negotiate an external world is widely associated with the work of Johnson-Laird (1983), who wrote that "[H]uman beings understand the world by constructing working models of it in their minds" (p. 10). However, the general idea of mental models is not unique to Johnson-Laird and permeates much of cognitive and social science. Although cognitive scientists debate the variously proposed architectures of mental models, there is wide agreement that mental models rely on some type of symbolic representation scheme (see, for example, Carley & Palmquist, 1992). Typically, within most such schemes, symbols function as ideational kernels whose meaning is conferred through their association with other symbols. This is true whether the symbol happens to represent a proper name (e.g., Shakespeare) or more general concepts or ideas (e.g., white, passive action, or creates). In some schemes, such associated sets of concepts take the form of propositions; in others, associational networks. In most characterizations, mental models are themselves structures for organizing discrete pieces of information (of differing size and internal complexity) that contain within them other discrete pieces of information. In these characterizations, whose truth we assume here, the pieces of information within a mental model are discrete and separable. Consequently, each piece of information, no matter how tightly linked to others in the individual's mental representation, can nonetheless be communicated separately, learned separately, lost separately, and "understood"<sup>3</sup> out of the context in which the individual originally understood it. This factor is very important

for understanding the potential destabilizing nature of communications, one of the primary projects of postmodernists.

### Communications

*Communications* refer to the semantic and pragmatic representations carried through speech, writing, print, electronics, or some other medium when people externalize aspects of their mental model in social interaction. We distinguish communications, on the one hand, and codes and messages on the other. Codes refer to the semantic representations that have been fixed (or frozen) in some medium (e.g., the sounds of speech as heard by a listener and fixed on a tape recorder or the verbal and visual layout of a piece of writing). Style analysts examine written code; speech analysts study voice codes from a sound recorder. Messages, even in ordinary parlance, refer to information whose stability of meaning is authorized from an authority outside the speaker (e.g., the boss telling an employee to send other employees the message that *so-and-so . . .*). Unlike codes, communications are not modality dependent; unlike messages, communications are not stabilized by an authority outside the speaker. Communications, rather, are components of an individual's mental model that the individual has chosen to externalize in social interaction. Because mental models are organizations of discrete components that can be understood, learned, or lost separately and because communications are merely externalizations of these models, communications can be partially received, partially garbled, partially lost, partially taken out of context, and so on. They have all the characteristic slippage and instability of meaning that postmodernists claim them to have. This slippage of meaning is usually accepted and acknowledged in highly personal and intimate relationships. But it also confounds the most public contexts of communication. On January 29, 1992, for example, Alan Greenspan, chairman of the Federal Reserve, announced that the economy seemed headed for an upswing and so it would not be necessary to lower interest rates further. He then immediately went on to reassure investors that if the economy did not pick up, interest rates would be lowered as needed. After Greenspan's announcement, the stock market suffered a precipitous drop and the news wires, trying to explain the event, reported that investors had heard the first part of Greenspan's announcement and had utterly missed the second.

### AXIOM 3: PEOPLE CREATE COMMUNICATIONS OUT OF THEIR MENTAL MODELS

A communication is an externalization of a portion of an individual's mental model as it exists at a particular point in time. Once the communication is issued, our best chance of retrieving its immediate meaning is to be in close proximity (in time, space, and culture) with the communicator when he or she issued it. Failing that, our next best chance is to have the communication frozen in coded form, perhaps as a video or audio tape of a speech, perhaps as a printed document. Because of the unreliable nature of a communication as an encapsulation of a mental model, the more transactions it has gone through before getting to us, the less reliable it becomes as an encapsulation of an original communicator's mental model when uttering or composing it. After many embedded levels of indirect reporting (e.g., he said that she said that . . .), communications tend to become increasingly less reliable a representation of an original source, like hearsay and gossip. After passing across too many third parties, moreover, the mental model that produced a communication can be fully eclipsed by third-party elaborations. Eisenstein (1979) and Ong (1982) have made much of the fact that this process of third-party distortion is less likely to happen with the printed text because of what they call the fidelity of print. By fixing communications within a mechanically reproduced visual/spatial code, it is easier, they maintain, to keep the components of the communication and their various interrelationships relatively intact. This occurs despite the number of intervening third parties who have interacted with the code and elaborated it with new meanings, and despite the spatial, temporal, and cultural distance that might now separate the author of the text from the current reader.

#### Signature

Another way to describe these characteristics of fixity is to say that print can emulate certain aspects of proximate speech by protecting the communicator's signature. A signature is an abstraction that links an individual's unique mental model with an external artifact, including a communication, instantiated in air waves, texts, or electronic impulses, that the mental model is responsible for producing.<sup>4</sup> Individuals always leave a signature, a trace of an intelligence, up front or behind the scenes, behind the actions and artifacts that take sub-



stantial and sustained cognition to produce. Communications are examples of such artifacts. Planned oral discourse (e.g., the ancient speech) as embodying a signature was not a difficult abstraction, given the proximity between the mental model of the speaker and the physical delivery of the speech. But it had to be a more difficult abstraction in early writing systems where the communication could move, disembodied, across contexts with the writer nowhere in attendance (and perhaps dead). According to some literature, our ability to conceive of the authoring role and the abstraction of an author's signature developed together, as both relied on the idea that a text could be used to transmit across time and space a high fidelity, accurate, and enduring record of an individual's internal thought. The concept of the authoring role and the abstraction of the author's signature seem to have been late developments in writing systems, as the earliest texts were used to archive general information (e.g., lists, bills of sale, birth and death notices, etc.) rather than to reveal the content of an individuated state of mind (Giddens, 1987). For Mallon (1989), the authorial signature was an outgrowth of print: "[T]he writer, a new professional, was invented by a machine. Suddenly his capital and identity were at stake" (p. 4). Print transformed the author's signature into a commodity of measurable and relatively enduring value. One might make a similar argument about cinema in this century transforming an actor's signature.

### *Signature as Handle*

The most common way to think of a communicator's signature is as a handle. A handle is any mode of expression used to identify or reference a particular communicator through one or some set of his or her signed communications. The most common handle for a communicator is his or her proper name. The proper name was the natural way, uniquely, to identify the signature of an agent working in proximity with others. But it was not at all a natural device for naming texts prior to the conventionalization of the authorial signature. While we now call authors by proper names, that was a rather late development in the history of indexing. The bibliographical practice of using the proper name as the primary key for indexing texts was practiced in Greece, but the practice did not gain systematic acceptance until the 1500s (McInnis & Symes, 1988, p. 391). The authorial handle apparently developed with the examples of Dante,

Petrarch, and Chaucer, who signed texts with their real names. Signing a text became a way to ensure the responsibility of the author. In 1641 the English House of Commons tried to curb seditious writings by ordering the Company of Stationers to "neither print, nor reprint any thing without the name and consent of the Author" (Kernan, 1987, pp. 71-72).

Writers can, to some extent, control their own handles through the text they create and the representation of self they portray in it. Cherry (1988) has worked out a revealing continuum of how an author's self-representations can inform a handle. Cherry's continuum, somewhat simplified here, is as follows:

historical author → ethos → implied author → persona

According to Cherry, an author's ethos represents the credibility of the historical author, the person writing in the actual situation. Cherry identifies the implied author with the constructed writer, behind the scenes, making reasoned choices about the authorial persona, the image, or personality of the author as projected through the communication. Cherry shows how these levels of self-representation in a text allow readers to make critical discriminations between the historical author and the author as persona. While communicators can try to have some say in their handle through the art of self-representation embodied in their communications, handles are more than self-representations, not merely in the cognitive control of the individual at the time the communication is designed. Handles are also social attributes that become attached to the communicator's signature over time and space by listeners and readers and by the word of mouth they are able to influence. A writer working for Apple learns to make documents that maintain the corporate image of Apple. But whether or not the documents retain the desired Apple handle and the corporate signature depends upon the conditions under which the documents circulate and the editing they undergo in transit as well as the conditions of their initial design.<sup>5</sup>

### *Signature as Style*

Communicators up close can also convey a signature through the compendium of attributes called, for want of a better word, their style: their manner, gesture, voice, body language, and so on. The printed word and all forms of electronic communication seriously eclipse

traces of the individual communicator's distinctive style. Nonetheless some communicators, because of a distinctive vocabulary, uncommon syntax or diction, or just plain "attitude," are able to project a handle that still shows up through professionally standardized type or e-mail.

### Reach

Individuals who are able to have their signature assimilated within the mental models of other agents are able to reach (or have reach) with those agents. Reach (used as a noun) is a property of all individuals in a sociocultural system, and it refers to the number of people whose mental model an individual can affect with a signed communication. A gossip is notorious for having wide reach in interpersonal circles. Diffusion, the process by which information moves between individuals within the system, and reach, the result of this process, are intimately related. The mode of communication does not affect whether the individual has reach but, as we will see below, it can affect the degree of reach achievable. There are various factors that can systematically restrict reach. Psychological, economic, and political forces can interfere with the production of a communication, its transmission, or reception.

We can measure reach in a variety of ways, depending upon exactly how we think of reach, both conceptually and methodologically. For example, a gossip or rumormonger with a wide circle of friends has more reach in terms of sheer number of people than does the social isolate with few friends; however, the quality or accuracy of the reach in terms of what is communicated may not vary, especially if everyone radically distorts what the gossip says while repeating the communication to others.

To consider all that is involved in a communicator's reach, we need to think of the communication (or series of communications) at issue in social, cognitive, potential, and temporal terms. Socially, we need to understand both who and how many are reached by the communication. Cognitively, we need to understand how much of the information in the communication has been accurately grasped in the mental models of others. Potentially, we need to consider whether the communicator's reach is an actuality or simply remains a potential. Having a printing press, for example, always increases a communicator's potential reach. But if all the printed flyers end up in a desk

drawer, its potential reach is never actualized. Temporally, we need to consider whether the reach is meant to be contemporaneous, finding its audience roughly at the same time that the communication is issued, or over time, continually seeking new audiences long after the time of the initial communication. We cannot necessarily say that the longer a communication circulates, the greater the reach of the communicator. For as it circulates, individuals can elaborate the communication beyond the recognition of the mental model that first produced it. The longer a communication circulates, the likelier it is that new audiences will never directly interact with the original communicator's signature, but with one that belongs to dominant elaborators or a dominant set of elaborations down the chain. Elaborators and elaborations down the chain become dominant (cf. Williams', 1962, 1977, 1981 notion of dominant culture) when they manage to control the word of mouth on the subject of the original and so control the signature that rises to social knowledge about the subject of the communication. Dominant elaborations, in this sense, can literally steal the reach of an original communication. For example, for movie-goers from the 1930s, the dominant image of Boris Karloff and the Universal production of *Frankenstein* arguably stole the reach of Shelley's monster and the classic novel that introduced it. For a generation of movie-goers from the 1990s, moreover, it may be that Oliver Stone and Kevin Costner steal the reach on the Kennedy assassination once held by the Warren Commission and the actual prosecutor, Jim Garrison. Critics who savaged *JFK* did so because they rightly understood the film's power to remake history. One defense of canonical texts, it should be noted, is that, despite attempts to steal their reach through endless adaptations and popularizations, the thievery never works because the original dominates any adaptation in its elaborative capacity (or so this argument for canonicity goes).<sup>6</sup> We generally define significant cultural producers as agents with reach well beyond the bounds of personal proximity. Significant cultural producers have their signature on a range of artifacts (including communications) that are both independent of and significantly wider than the trajectory of their proximate contacts.

### Communicative Authority

We can see that reach is a stratified notion. Some people have more reach than others. Disparities of reach often arise because of differ-

ences in power and status. But they also arise in a less intrusive sense from the ongoing project of knowledge acquisition we have been describing from the start. Given the reciprocity between knowledge and social interaction and the principle of relative similarity, it stands to reason that communicators who know more and who know more things in common with more people will have more reach than those who know fewer things and who share their slighter knowledge with fewer persons. We call this relationship between high relative knowledge and reach communicative authority. Persons with the most communicative authority within a social system have the greatest capacity to change it. The relationship between authority and change may not be obvious on the surface, so let us pursue it further by discussing communicative authority and ancient rhetoric. Communicative authority seems to have underlain one of the ideals of the ancient orator, particularly in the Ciceronian tradition, where it was assumed that the orator had to know everything that the ancient world knew and so more than most any ordinary individual knew alone. To know more than most and yet to share much of what one knows with many is to create an environment for change, for it allows enough overlap (by dint of relative similarity) between the orator and the less knowledgeable audience member for each to have a payoff in wanting to interact, based on their mutual project of knowledge acquisition. And yet it still allows enough of a discrepancy between the orator and the average listener to insure that the latter will eventually (with enough interaction) learn and so be changed by what the orator has new to teach.

Generalizing the same point to any sociocultural environment, communicators with the most reach on the strength of the most shared knowledge with other individuals are likely to produce the most change. Their communications are most likely to enlist interaction partners and most likely to change—eventually if not immediately<sup>7</sup>—their partners' mental models after they are enlisted.

It is important to note that the authority of communication under discussion here is an epistemic authority, an authority granted through knowledge. We must distinguish this knowledge-based (cognitive) authority from the social channels which enable or restrict the exercise of this authority. These social channels include traditional authority, institutional authority, and authority of position (see Weber, 1968). Such channels determine the extent to which interaction is knowledge driven or imposed from without by outside factors, beyond the individual's own self-interest and low-effort acquisition habits. A teacher

who requires a student to write a term paper without stimulating the student's native curiosity constitutes evidence that patterns of interaction can be dictated through the subjugation of one will by another. While social controls on interaction are pervasive, they fail to satisfy the long-term acquisitive habit of individuals and put in peril institutions (including schools) that try to flout, rather than build upon, the natural acquisitive habits of the individuals within them.

**AXIOM 4: PEOPLE EXERT COMMUNICATIVE  
AUTHORITY BY CHANGING THE MENTAL MODELS  
OF OTHERS THROUGH COMMUNICATIONS  
BEARING THEIR SIGNATURE**

This axiom indicates that a definition of communicative authority is not complete without including information about the signature. We should acknowledge right away that it is easy to change the mental models of individuals without a signed communication and without the exercise of communication at all. There is a significant difference between exercising communicative authority and issuing a communication to announce the exercise of authority as a *fait accompli*. An emissary recounting what a king has already ordered falls into the second category. Communicative authority, on the other hand, is the degree to which an individual can effect change in the mental models of others through a signed communication. Communicative authority, more strictly speaking, is rooted both in the signature ideas of the communication and in the reach of that communication. For print contexts, this distinction can help us understand the difference between the communicative authority of an author and an authorized reading. An authorized reading is a message (see the definition of message above) imposed and stabilized by an external authority with the intent to pass it intact across transactional contexts. Authorial authority, on the other hand, refers to the extent that the signature ideas of an author (for example, Shakespeare) are assimilated into the mental models of others. Despite the threat of dominant elaborations obliterating a signature, the level at which signature ideas need to be assimilated in order to maintain their communicative authority can be quite loose. We certainly do not question Shakespeare's authority as a cultural communicator simply because of divergences in how he is interpreted. Simple rules of categorization seem to come into play

to help us distinguish communicators who maintain authority across divergences in how they are elaborated over time and communicators who lose authority in the face of this divergence. For example, suppose the accepted word of mouth and so social knowledge about Shakespeare (as a concept) came to be associated only with a type of English accent or the name of a famous theater; then the reach and authority of Shakespeare as a historical figure would be largely decimated. To maintain authority, the communications (plays) through which Shakespeare achieved his reach cannot be eclipsed or dominated by artifacts (accents, theaters) or communications (comic books) that mask the categories of the original communications (see Foucault, 1977, for discussion of the author-function).

Thus far we have been discussing concepts and axioms as they relate mainly to deciding on an interaction partner and negotiating meaning with him, her, or it. We need now to introduce a concept and an axiom most illustrative of the complexities introduced when we want to understand distancing as it relates to the larger adaptive consequences of communications aggregating concurrently and over time.

### Concurrency

*Concurrency* means that many individual communicators are making decisions about interaction partners, negotiating meaning with them, and adapting what they are learning from one another at the same time. Strictly speaking, concurrency is not an assertion that all interactions occur more or less at the same time; nor even that all individual communicators (and communications) are affected by other communications roughly going on at the same time. Concurrency is rather an assertion that, if at any point in time, we were able to take a snapshot of the world, we would see multiple groups of interactors, some of whose local interactions influence and are influenced by other interactions going on elsewhere. Perhaps more importantly, we would find that such concurrent interactions play an important role in rapidly spreading the reach of many of the meanings that claim an already wide reach across communicators and transactions. Concurrency explains, for example, how the diffusion of a communication within a small town can become so rapid. It further explains how the communication diffused can become—even with no intention to deceive—so confused; for as Aaron is telling Mollie what Cassi thinks,

Cassi is busy changing her mind in interaction with Jamie. Were it not for the concurrency of interaction, interactions would be sequential, information would diffuse more slowly, and there would be less confusion due to communication. Knorr-Cetina (1981, pp. 35-48) has commented on how historians have recently come to appreciate the role of confused communication due to concurrency in explaining significant historical events, including wars. She makes specific reference to the Thirty Years War, a conflict that each country desperately wanted to avoid but that ignited because of the interdependence of events over which no country exercised full control. Simon's (1983, pp. 18-20) notion of bounded rationality is dependent in part on concurrency. The rationality of individuals is bounded because the outside environment represents a level of complex, coevolving interdependencies too intricate for cognitive systems to grasp in toto.

#### AXIOM 5: COMMUNICATORS CAN ACT CONCURRENTLY

Although concurrency is a vital and complicating factor in explaining communicative transactions, the description of communication on which we have so relied makes no explicit use of Axiom 5. Our discussion thus far, in other words, remains compatible with serial models of communication. Serial models assume that communicators decide on interaction partners, negotiate meaning, and adapt their learning in fixed order and along an assembly line in which the output of one interaction becomes the input of another. A serial conceptualization of communication makes the communicative coupling a static (even if over-time) interaction, one that overlooks the parameters of simultaneous learning and the effect of simultaneity on over-time patterns of interaction. It further overlooks the dynamics of competition insofar as communicators are simultaneously learning about their environment and adjusting their mental models and their calibrations of relative similarity based upon these adjustments. Estimates of concurrent relative similarity, like characters in a soap opera, need not be symmetrical nor stable in their patterns of interaction. Once we add the factor of concurrency to relative similarity, communication becomes one moving target trying to engage another, which may be moving in the opposite direction (e.g., some pundits report that as George Bush was making overtures to Pat Buchanan to be his



liaison to the right wing of the Republican party, Buchanan was making overtures to oust Bush).

The factor of concurrency, along with the capacity of human agents to learn and to update their mental models through the reception of communications, explains better than before why a certain reciprocity (Axiom 1) is required among communication partners who end up exchanging information with one another. The reciprocity results from the fact that, for an exchange even to take place, individuals have had to make assessments of one another in competition with the assessments of other communicators in the environment. For the communicator, continued interaction with a target group of listeners and readers depends, in some sense, on the communicator's ability to stay a workhorse and to maintain the attractions he or she holds for the audience—like Dickens was able to do for the English reading public. But communicators can also grow further apart. Individuals can learn from others that they should really be interacting with someone else—socializing with Bill instead of Mary, reading primary rather than secondary accounts, reading a cited text rather than the text one is now holding that cites it. Through negative feedback or poor sales, writers can also learn from readers that they should really be writing for other readers. In each of these cases, we cannot assume that communicators are locked in an eternal embrace. Understanding communicative interaction as concurrent brings to light why interaction is competitive and interactions between specific individuals often short-lived.

### **Distance and the Mode of Communication**

In the previous section we considered the communication situation in general, across assumptions of proximity or distance. The concepts and axioms we considered applied regardless of modality. Accordingly, we were able to draw our examples in the previous discussion from speech, writing, and print. Now to understand specifically written and other technologically enhanced forms of communication that support communication at a distance, we need to understand not only the basic communicative act, but also how it is altered by the distancing technologies of writing, print, and electronics. We also need to understand how these distancing technologies can influence the proximate notion of reach.

### Relating Distance to Reach

Distance can be understood by relating it to reach. Reach is a property of the individual; specifically, the number of people whose mental models can be actually or potentially affected by an individual's signed communication. Distance is a measure of the difference between communication partners. For example, temporal distance might be measured as the years between the time an author creates a text and a reader reads it; spatial distance might be measured as the number of geographic miles between the author's location and the reader's; and sociocultural difference might be measured, at least thought of, this way: The more diverse the populations represented by the author and the reader and the more diverse the systems of beliefs and norms those populations represent, the more sociocultural distance. Clearly, communication technologies, by affecting the potential distance a communication can traverse, also affects the author's reach. This point is captured in Axiom 6.

**AXIOM 6: THE GREATER THE AVERAGE  
POTENTIAL DISTANCE ACROSS WHICH  
AN INDIVIDUAL CAN INTERACT,  
THE GREATER THE POTENTIAL REACH**

It is important to understand the compatibility between this axiom and Axiom 2. According to Axiom 2, the greater A perceives his or her relative similarity to B, the more likely A is to attempt interaction with B. The current axiom ostensibly contradicts this axiom because it seems to relate interaction and reach with distance rather than relative similarity. The contradiction is only apparent and can be resolved by understanding the complex relationship between distance and relative similarity. Distance between two individuals can be measured temporally, spatially, or culturally. Of these, only cultural distance is directly related to relative similarity. On average, the more culturally distant two individuals are, the lower their relative similarity. However, having low relative similarity does not mean that two individuals will not interact; it simply means that they are unlikely to do so. The potential for interaction still exists.

An individual's potential reach can be measured in terms of the number of individuals with whom he or she can potentially interact.

The notions of temporal and spatial distance now come into play. An individual who cannot interact with some others because of spatial and temporal constraints is limited in his or her reach. For example, an illiterate peasant in a medieval kingdom, regardless of his or her relative similarity to a migrant farmer in 20th-century America, simply cannot interact with the farmer. The peasant's potential reach is limited to those who are temporally and spatially near. Yet, if we ease the constraint of distance, for example, by turning the peasant into a literate monk in a medieval monastery capable of composing new written communications, then we increase the individual's potential reach across time and space. Generally speaking, relative similarity is related to interaction (Axiom 2) and neither is incidentally related to proximity; yet as we will see below, technology (in this case, writing) can increase the potential for relative similarity and so the average potential distance (Axiom 6) across which individuals can interact, even in the absence of proximity.

An individual communicator who becomes an author potentially reaches more people and reaches them faster. From the author's side of the equation, the unchanging text makes this greater reach possible. From the reader's side, the constancy of the text can make reading that much more difficult since the meanings of the text at the time of its composition can be far removed from the context of the reader's environment. Speech exhibits the opposite tradeoffs. The lack of a permanent code diminishes the reach of a speaker but the cotemporality required by speech eases the listener's burden. Foucault (1977) and Giddens (1987) have both recognized the unusual extensionality of the writer in contrast to the speaker. Giddens (1987) draws a quantitative relationship between the reach of writing and print: "[P]rinting is for the most part a quantitative extension of [writing]" (p. 200); and he argues that, as the author became a voice of the church, government, or commercial institutions, the author's written expression changed qualitatively. It had to pull up its moorings from the situated references of talk and become less dependent on specific contexts of utterance.

Since language, as "carried" by cultural objects, is no longer talk, it loses its saturation in the referential properties which language-use has in the contexts of day to day action. As a visible or recoverable trace, separated from the immediacy of contexts of talk, the signifier becomes of peculiar significance. (p. 200)

Giddens paints a picture in which the development of writing, print, and formal organization placed stresses on language that caused it to change from within. We suggest that the order of causation is just the opposite: Writing and, in particular, print increased the reach of the author sufficiently to make interaction at a distance possible and so foster the social development of more complex organizations (Kaufer & Carley, 1993). What is distinctive about written communication is not, as Giddens suggests, that the written communication can survive without a context, but that it can survive across greater temporal, spatial, and sociocultural distance. How is this possible? What technologies add to the communicative transaction is the potential of distance. More specifically, technology adds three distancing concepts to allow it to break the bonds of proximate communication: asynchronicity, durability, and multiplicity, which we now describe in more detail.

### Three Distancing Principles

#### *Asynchronicity*

Asynchronicity involves the flexibility that frees communication partners from having to work at the same time. Requiring individuals to work synchronously meant there could be no distance in time and, often, space. Asynchronicity freed communicators from both requirements.

#### *Durability*

Durability involves the length of time the content of a communication is available for interaction. Writing and print made communications more durable by fixing language on a visible surface that could be read and reread. Unless handed down from one generation to the next, the content of talk lacks durability and is easy to forget. Isolated manuscripts also lack durability insofar as the code on which the communication is inscribed can disintegrate. With print, texts could have a life that extended well beyond the physical life of the author. Durability, like asynchronicity, can also increase the distance of communication. Even more than asynchronicity, further, durability can speed the diffusion of a communication, for a single durable commu-

nication can be received by different individuals at different times (one passing it off to the other).

### *Multiplicity*

Multiplicity refers to the number of communication partners that can be communicated with at the same time. In the simple dyadic oral exchange, multiplicity is low: There is only a single communication partner. In contrast, the one-to-many nature of both the written mode and the oration grant the communication greater multiplicity. Multiplicity guarantees greater spatial distance than that which is needed for the simple oral exchange. For example, the spatial distance between the orator and audience is generally greater than would exist between two individuals having a discussion.

Multiplicity also has another feature, speed. If multiple people can be communicated to at once, then the information also spreads faster. The increased speed offered by multiplicity is not always advantageous to individuals or to groups. For with multiplicity, both fact and rumor can spread faster and group boundaries can become blurred (Kaufer & Carley, 1993). For the simple face-to-face exchange, communication tends to be synchronous, nondurable, and to have zero multiplicity. The oration adds distance on one dimension—multiplicity,<sup>8</sup> but not on asynchronicity or durability. In contrast to these oral modes of communication, the written mode is both asynchronous and durable but, without special systems of copying, tends to lack multiplicity. Print communication, even more than writing, adds multiplicity, and electronic communication, in the form of transcontinental networks, coordinates all three distance parameters over larger areas of time and space than print. The greater the temporal and spatial distance between communicators, the greater the potential sociocultural distance, which is why electronic communication has come to be associated with cross-cultural communication, even more than print.

### *Implications*

Technologically-enhanced communications relying on distancing principles like asynchronicity, durability, and multiplicity represent communication at a distance within complex social systems. Drawing from the literature in postmodernism, social theory, network theory, cognitive science, and knowledge representation, we have presented

a set of concepts and axioms to show how these principles both integrate within and extend a theory of proximate communication. The concepts and axioms described herein are incomplete and we have given them lengthier and more formal treatment elsewhere (Kaufer & Carley, 1993). Yet they are sufficiently elaborated even here, we believe, to suggest how they can help us begin to extract and theorize about the distancing assumptions so deeply embedded in our technological experiences with the language, beginning with writing. This article has focused on articulating this set of concepts and axioms rather than indicating how it might be applied to address historically situated questions about communication at a distance.

We close by briefly discussing two major areas of application. (1) The first area is the computer modeling of communication systems, both proximate as well as technologically enhanced systems (of writing, print, electronics) that accommodate asynchronicity, durability, or multiplicity. Although we have described these concepts and axioms in nonmathematical terms, they have a mathematical realization that we have used as part of computer simulation models to describe systems of communication varying in the type and range of distancing assumptions they accommodate. Carley (1990, 1991) originally developed a simulation model of proximate communication to understand group behavior in face-to-face settings. Her simulation model is easily expanded to accommodate asynchronicity, durability, and multiplicity, and Kaufer and Carley (1993) have used this extended model to run computer-aided *gedanken* experiments about the effects of different technological modalities (e.g., face-to-face, writing, print) on social and cultural organization. They have found, predictably, that print greatly extends the reach of an individual in a social system relative to face-to-face communication and simple (noncopyable) writing systems. At the same time, they have arrived at simulation results that are more surprising.

One surprising result of interest to readers of *Written Communication* is that face-to-face communication becomes increasingly efficient for knowledge acquisition, relative to print communication, when it is used within a small and tight-knit group. The very factors that make print a good long-distance mode of mass communication also make it a less functional, even subversive, mode of communication when one is trying to keep the boundaries and interactions of a small group well drawn. Within a small tight-knit group, the speed of print offers little or no advantage; the relative anonymity of print is a decided disadvantage to a group already used to working with one another

on a face-to-face basis; and the permeability of print (opening up the group to outsiders) poses a threat to the group's internal stability.

(2) This result has important consequences for writing education, for classrooms are precisely small intimate groups with well-drawn boundaries. Even in a classroom designed to teach writing, the written or printed word seems a less inviting learning medium than the spoken word because of the proximate space of the classroom. Classrooms are often thought to be artificial environments for teaching written communication to a general readership. But the reasons for the artificiality go far beyond the fact that they confine writers and their readers within four walls and so minimize the temporal and spatial distance between writers and their readers. The reasons are also more theoretical and structural, having to do with the fact that learning to write within the confines of the classroom entails learning from an ostensibly contradictory premise: that students can get practice in literate communication at a distance with teachers and peers with whom they have, relatively speaking, minimal distance in time and space.

This is not to say that writing classrooms are dispensable units of education or that they factor out distance altogether. In a heterogeneous society such as ours, proximity in time and space does not foreclose distance in culture, gender, race, and ideology. In their face-to-face dealings, students have learned to engage persons of different social, cultural, and ideological backgrounds. The proximate writing classroom allows students to practice these same engagements through literate means. Nor should it be overlooked that teachers in the proximate classroom often expect students to leave the classroom, at least temporarily, while searching for ideas, and then expect them to practice adapting these external ideas to the written register.

The proximate writing classroom is thus not devoid of some important (albeit implicit) lessons about distance. Nonetheless, the focus of such classrooms, certainly at the freshman level, has been the written register itself rather than the distancing assumptions of writing. This is perhaps as it should be for introducing students to writing. For much can be learned about the written register while leaving issues of distance implicit. Yet it seems to us that moving to a more advanced mastery of the written register requires students to grasp how much that register has been designed to accommodate the distancing assumptions of writing. If our aim is to move writers into the world of work, where the ability to communicate at a distance is essential, then students must, sometime in their education, be increas-

ingly confronted with a model of written communication that exposes them to distancing assumptions at a more explicit and theoretical level.

Authors on the free and professional market are paid to be read and are rewarded commensurate with their reach. Students, on the other hand, must subsidize their readers (teachers), and the reach of their work is almost never measured as a dependent variable. Their texts are seldom put in a competitive situation where they have to compete for readers based on principles of relative similarity with the reading audience. In sum, classrooms are seldom organized to simulate, even in the weakest respects, the distance characteristics of written and print communication in the real world.

More realistic simulations for education, even within the proximate context of the classroom, are not inconceivable, however. The free market can be simulated, for example, by having a teacher grade a student's text on the voluntary circulation it achieves in competition with other texts. In addition, if reading is taught as a cognitive resource that individuals must expend at the expense of other social (even fun) activities, students can better come to appreciate principles of relative similarity, reach, and concurrency. Lessons in asynchronicity can help students understand why the negotiation of meaning between author and reader is nontrivial (as author and reader are at the very least separated by space and, maybe even in important ways, by time and culture). Lessons in multiplicity can help students understand why writing and reading are competitive activities (as copies of a few excellent student texts can potentially hog all the cognitive reading resources of the remaining members of the class). Nominating excellent student texts to become models for future classrooms provides students with an excellent lesson in durability.

As students can learn about macroeconomics without bringing all the complexity of the world economy into the classroom, they can also learn about macropinciples of communication at a distance without replicating all the conditions required to engage in long-distance interaction. What should be avoided in advanced writing education are students learning about communication at a distance when there is no explicit instruction about distancing principles and when the writing curriculum is itself mainly implemented within assumptions of proximity. The task of teaching literate behavior is made all the more difficult when we teach it under assumptions that make it more rational, relative to the purposes of knowledge acquisition, for the



individual student to speak face-to-face than to write. In that case, students can only acquire a skeleton of the written register because they can only glimpse a skeleton of the authority they can potentially exert through it.<sup>9</sup>

## NOTES

1. Carley (1990, 1991) has examined the long-run influence of this motivation for social change and stability when relative similarity is understood just in terms of knowledge. Work is currently under way to explore how the relative distribution of opportunities for contact or proximity can influence interaction as well.

2. In the computer model we have used to represent the mental models of individuals, language, meanings, and histories are synonyms. They all refer to a complex network of semantic information that communicators accumulate over time as a result of their history of interaction. Language and meanings are thus profoundly intertwined with a communicator's history, making our notion of language very compatible with the social pastiche described by Bakhtin (1981). In our model, language and meanings have a cognitive basis, but they become socialized to the extent that individuals share pieces of their internal networks through communication (see Carley & Palmquist, 1992).

3. We place the term "understood" in quotation marks to call attention to the fact that ours is not a theory of comprehension. When we use the word understand, we mean to specify any one of an umbrella of possible processes by which information exchanged from one communicator can alter the mental model of another. It is beyond the scope of our current model to differentiate levels and types of understanding at a finer grain.

4. The process underlying this and the representational schemes that admit more precise description of this process have been discussed by researchers interested in mental models and their construction. See, for example, the work by Johnson-Laird (1983) and Sowa (1984).

5. It remains an interesting problem to theorize about and trace the development and social/ethical implications of corporate or institutional signatures, the role of forged signatures, and so on. For some discussion of the problem, see Kaufer and Carley (1993).

6. We simply report this as one possible argument for the effects of a text that warrant it to be canonized. We take no position on the legitimacy of this argument in the present context.

7. We make this qualification to emphasize that the reception of a communication does not guarantee that the receiver grasps or comprehends any of its contents, nor that any of the content is learned by the receiver and so changes the receiver's mental models.

8. These modes differ in many other respects that are beyond the point of this article.

9. For some interesting and complementary discussion of the ideological dilemmas of teaching authority in the writing classroom, see Greene (1990) and Geisler (1993).

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