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Electronic Mail and Organizational Communication: Does Saying "Hi" Really Matter?

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S arbaugh-Thompson and Feldman report on the impacts of an early multiyear trial with electronic mail. As organizations become increasingly distributed in time and space, will dependence on electronic communication change the balance between formal and casual conversation among workers? If so, what are the long-term consequences for organizational life? The current study will pique the interest of researchers interested in these and related questions.

Gerardine DeSanctis

Abstract

When people use electronic mail, they can communicate even when they are not physically or temporally proximate. Thus, it is not surprising that most studies report that the use of electronic mail increases organizational communication. In the study presented here, overall organizational communication declined as use of electronic mail increased. As we probed the nature of this decline, we discovered that much of the lost communication was greetings. This raises questions about the role that greetings, and other forms of casual conversation, play in an organization. To organize our insights about this topic we formulate a two-by-two communication matrix based on presence versus absence and availability versus unavailability. Prior research focuses on the ways being present and available and being absent but available through electronic mail affect the performance of specific communication tasks. Using our typology, we direct attention to the role of casual conversation in presence availability and to the parts that presence unavailability and absence unavailability can play in organizational communication.
(*Organizational Communication*; *Electronic Mail*; *Availability*; *Greetings*; *Co-presence*)

Introduction

Previous research on electronic mail has focused attention on the ability to communicate even though people are physically and temporally absent. Many of these studies show that it expedites communication among people who might otherwise communicate infrequently or not at all (Feldman 1987, Sproull and Kiesler 1991). This releases organizations from the bounds of time and space and from dependence on face-to-face communication, creating what Sproull and Kiesler (1991) call a "networked organization" in which people can be available even when they are physically absent. We call this absence availability, in contrast to settings in which people are proximate and available for communication, presence availability. Much has been written about the differences in communication for people who are physically present and those who are not (Rice 1984, Sproull and Kiesler 1986, Culnan and Markus 1987, Zuboff 1988, Schmitz and Fulk 1991, Walther 1992).

While this research has been extremely useful, we believe the focus needs to be expanded. Specifically, the importance of face-to-face communication has been attributed primarily to the need for co-presence to perform certain tasks. Researchers have approached the question of the impact of electronic mail on organizations by assessing the abilities of individuals or groups to perform specific tasks using different communication options (Rice 1984, Daft and Lengel 1986, Zack 1993). This research does not emphasize the importance of casual contact that occurs when people are co-present. We suggest

that this sort of contact serves important functions in organizations when the participants are available but also when the participants are unavailable. We discuss these functions later in the paper as we develop a four-cell communication matrix based on presence and absence, availability and unavailability.

The impetus for this reconceptualization arose from an experiment to increase electronic mail usage in a small unit of an increasingly networked organization. According to prior research, "the adoption of a new medium for interorganizational communication normally serves to increase rather than replace the communication via existing media" (Contractor and Eisenberg 1990, p. 160; see also Culnan and Markus 1987). To our surprise, survey data comparing communication in 1987 (the year the electronic mail experiment began) and 1989 indicated that organization members who responded to both surveys decreased their intraorganizational communication overall. The increase in electronic mail communication did not offset the decrease in other forms of communication (face-to-face and telephone), producing a net decrease in overall communication within this group of organization members.

This piqued our curiosity about whether something is lost as well as gained when organizations rely on electronic communication. Some scholars suggest that electronic communication is more efficient than face-to-face communication (Rice and Case 1983), so we thought the decline in the volume of communication might reflect more efficient communication. Using network analysis, we discovered that the changes in the volume of communication reflected termination of some communication relationships. Therefore, the reduction in volume of communication did not reflect simply more efficient communication among the same number of actors, although this may be a factor in the decline. It also reflected a decline in the number of pairs of people communicating.

Further analyses revealed that many of the missing communication connections were greetings. This prompted us to explore the role of greetings and other forms of casual communication in organizations. To integrate our insights on this with other work in the field of organizational communication, we developed a framework combining two dimensions of organizational communication: presence and absence and availability and unavailability. Much has been written about absence availability and presence availability, and we summarize some of this below. Much less has been written about presence unavailability and absence unavailability.

Comparison of Communication Options

Electronic mail provides a means to be available even when one is absent, yet absence availability and presence availability have different strengths and limitations. Absence availability expedites communication among actors who are temporally and spatially dispersed. Presence availability facilitates unintended, casual communication and is better suited to establishing frames of reference (Zack 1993). Research on communication between people who are co-present and those who are absent has been summarized by Culnan and Markus (1987) and by Walther (1992). They both refer to one of the primary differences as "cues filtered out." In short, electronic mail as a medium of communication provides fewer cues than face-to-face communication. Facial expressions, gestures, vocal intonation as well as indications of social position (size of office, type of clothing, gender) are obscured or minimized (Short et al. 1976, Daft and Lengel 1986, Sproull and Keisler 1986).

This lack of cues tends to have two effects. One is that the range of communication may be limited. Sarcasm, for example, is not well expressed on electronic mail. In general, some communications may be too complicated for the medium. Negotiating, for instance, may be more effective on a "richer" medium (Rice and Williams 1984). The other effect is an equalizing effect. People tend not to be as aware of the social hierarchy and may be more apt to assume equality. Thus, some people say more and some people say less than they would in a face-to-face setting (research summarized in Rice 1984, p. 146; Sproull and Keisler 1991, p. 59ff; McLeod et al. 1997). It also results in a broader range of expression, especially negative expression—called *flaming*—than might take place in a face-to-face communication (Sproull and Keisler 1986, 1991).

Culnan and Markus (1987) and Walther (1992) offer excellent critiques of this research as being primarily dependent on experimental rather than field settings and as being limited by the choices researchers have made in coding and analysis. Walther (1992) argues that in field settings (rather than laboratory experiments) people tend to compensate for these effects. They compensate for the limitations on the range of communication by using more verbal expressions than they would in the face-to-face situation (Walther 1992, p. 76). Indeed some research has found that people can become quite interpersonally involved even if they communicate only through computers (Johansen et al. 1979). They compensate for the equalizing effect through language, symbols, and format (Walter 1992, p. 78). Greetings and salutations, for example, can be powerful reminders of status positions. Names are often reminders of gender. Smiley faces [:)], frowns [:(], and exclamation points are indicators of mood and intensity.

A study of the use of electronic mail by journalists

shows how there can be differences between communications conducted by electronic mail and those conducted face-to-face, and it can also be true that in ongoing organizational settings people are likely to find means of compensating for what they find missing in any particular electronic mail communication. Zack (1993) found that the usefulness of electronic mail in an ongoing organizational setting was simultaneously great and limited. He found that, while journalists made significant use of electronic mail in the course of their work, they also needed face-to-face conversations to establish and maintain a common frame of reference. As long as they maintained face-to-face contact, they could compensate for any loss of meaning or context that might occur in the electronic mail communication.

The focus in this research has been on how people in organizations adapt to new forms of communication and how they accomplish particular acts of communication when a new medium is involved. The natural experiment we are about to describe forced us to think about an additional aspect of this picture: what are the implications for organizations when the increased use of electronic mail coincides with decreased interaction among organizational members?

The Experiment

In 1986, a teaching and research institute (hereafter referred to as "the unit") within a large research university initiated an experiment in electronic communication. The experiment consisted of two parts: support for electronic mail usage and administrative actions shifting all memos, announcements, and other routine intra-unit communication to electronic distribution.[2] Both parts of the experiment were designed to increase electronic mail usage among unit members. During the experiment, we administered three questionnaires. We also read all written documents concerning the experiment and the minutes of faculty meetings from 1986 to the present.

DeSanctis and Poole (1994) suggest that one way to assess an organizational change of this sort is to compare the "spirit" of the change with what actually happened. Spirit can be assessed by reading the various memos and letters that state why and how the change is undertaken. The experiment we observed was well documented, and the spirit can be succinctly stated: the change was undertaken to increase the use of computers in the workplace, with special emphasis on increasing the use of electronic mail in intra-organizational communication.

In terms of complying with the spirit of the change, the experiment was wildly successful. Between 1987 and 1989, the number of people who had ever used electronic mail jumped from 67.9% to 91.4%, and the estimated number of outgoing messages per week rose from 8.32 to 32.81. (see Table 1). But the outcome of the experiment was not, we believe, entirely beneficial for the organization. There were unanticipated consequences of the experiment. One of these was that the overall amount of communication in the organization decreased. Also, over time there were increased complaints in faculty meetings that the members of the organization were disconnected. Though it exaggerates the situation, we are reminded of the saying that the operation was successful, but the patient died. In the following section we present the survey and network data from this experiment and explain why we believe that the experiment is implicated in the increased feeling of disconnection among organizational members.

Research Methods

During the experiment, three questionnaires were administered over a four-year period, in 1986 (prior to the beginning of the experiment), 1987 (at the beginning of the experiment) and 1989 (after two years of experience with the experiment).[3] The latter two questionnaires (1987 and 1989) asked questions about individual unit members' communication with other unit members via each of four different types of communication—face-to-face, telephone, written, and electronic mail—and asked about the purpose of this communication: mostly work, mostly personal, mixed, and greetings. We used these data to construct matrices of intraorganizational communication for network analysis. Respondents reported their communication with other people in the unit by indicating the percentage of their communication that occurred in each of the four ways, the frequency of the communication, and its purpose. Someone who reported that 50% of their communication with a partner occurred using electronic mail, but who communicated once or twice a semester with this person, is communicating less than someone who reported that 50% of their communication with a partner occurred using electronic mail, but who reported

Table 1 Electronic Mail Use

	1987*	1989*
Have you ever used email? (% yes)	67.9% (28)	91.4% (35)
Estimate of number of outgoing messages per week	8.32 (28) minimum = 0 maximum = 40	32.812 (32) minimum = 1 maximum = 120

*Number of responses appears in parentheses.

communicating with this person on a daily basis. Because respondents also reported the frequency of their communication, we were able to adjust these percentages by the frequency to create something we call a communication unit. We constructed the measure by translating the frequency scores into numbers corresponding to the number of days in an average university semester and then multiplying this number times the percentage of communication reported using each of the four means listed on the survey.[4]

As is true with any naturally occurring experiment, many factors could influence the observed effects. For example, during the two-year period between these two surveys, some people left the unit and others joined it. Thus, the questionnaires asked respondents to report their communication with 45 unit members in 1987 and with 40 members in 1989. Due to changes in the membership of the organization, the 40 members listed in 1989 were not simply a subset of the 45 unit members listed on the 1987 survey, but rather included some new organization members and excluded some old ones. Thus, the two lists of possible communication partners were overlapping, but distinct, groups of people.

To compound this problem, some respondents completed only one of the two surveys, although they were members of the unit during the entire data collection period. Twenty-eight people completed a questionnaire in 1987 and 35 people completed one in 1989. Of the 35 people who completed the 1989 questionnaire, 17 completed the questionnaire in 1987. Therefore, any observed changes in communication pattern and volume of communication based on a comparison of the 28 1987 survey respondents with the 35 1989 survey respondents are subject to challenges that the composition of the group could account for some, perhaps all, of the change. Additionally, the differences in the lists of possible communication partners on the two surveys could account for some, possibly all, of the difference in communication. Therefore, we limited our comparison of communication volume to the 17 unit members who completed both surveys. These 17 unit members are a nonrandom sample of the unit.[5] They, however, do provide us with some means to compare patterns of unit communication across the two-year period in a way that avoids entanglement with organizational turnover, different response rates, and differences in the lists of communication partners on the surveys.[6]

Findings

Volume of Communication

As reported in Table 2, using the 17 respondents who completed surveys in both 1987 and 1989, we discovered

Table 2   Volume of Communication (In Communication Units)* 17 × 17 Matrix

	1987	1989
Valid Communication Transactions	275	275
Missing or Invalid Responses	14	14
Possible Communication Units (80 × 100 × Valid Transactions)	2,200,000	2,200,000
Reported Communication		
Overall Units Reported	882,300	677,000
% of Possible	40.1%	31.5%
Face-to-Face Units Reported	780,710	542,160
% of Possible	35.5%	24.6%
Electronic Mail Units Reported	45,040	96,964
% of Possible	2.0%	4.4%
Telephone Units Reported	34.155	23,381
% of Possible	1.6%	1.1%
Written Units Reported	22,395	14,495
% of Possible	1.0%	0.7%

*For the calculation of communication units, see pp. 6–7.

that although electronic mail communication increased, overall communication decreased. In 1987, these respondents reported that 40.1% of these possible communication units occurred using any of the four forms of communication on the survey. In 1989, they reported 31.5% of these possible communication units. Face-to-face communication declined from 35.5% of the possible units in 1987 to 24.6% in 1989. Electronic mail communication increased from 2.0% in 1987 to 4.4% in 1989. Reported telephone communication decreased slightly, from 1.6% to 1.1% on the possible units. Written communication also declined from 1.0% to 0.7%. Increases in electronic mail did not offset the decline in face-to-face communication.[7]

Simply looking at changes in the volume of communication reported in 1987 and 1989 tells us little about the nature of these changes and is subject to multiple interpretations, including the argument that the reduction simply reflects the greater efficiency of electronic mail communication. This argument asserts that there could be more information transmitted with a lower volume of communication using electronic mail than would be required to transmit the same information using some other form of communication, such as face-to-face.

In order to explore the plausibility of this argument, as well as other organizational implications of these changes in communication, we used a series of network analysis techniques that allow us to explore the pattern of organizational communication in greater detail. We created a

network of the 17 repeat respondents, those people who completed the surveys in both 1987 and 1989. We utilized the data provided about their communication with one another to form a set of 17 × 17 matrices of communication. We performed network analysis on the communication reported by these respondents in 1987 and compared it to their reported 1989 communication to see whether the changes in volume reflected changes in their pattern of communication as well.[8]

We limit the network analyses reported here to face-to-face communication, electronic mail, and one aggregate network of all organizational communication that includes face-to-face, telephone, written, and electronic mail communication. Given that the experiment involved electronic distribution of memos, one might assume that we would focus on changes in written communication. Because respondents reported so little written communication in either the 1987 and 1989 surveys (1% or less each time), we felt it would be highly sensitive to random shifts in measurement. In fact, given the limited amount of written communication reported, we suspect that people did not include memos for general distribution in the written communication they reported. The same limited usage of the telephone for intraunit communication was reported, as well. Therefore, we focused on face-to-face and electronic mail communication, as well as overall communication.

Connectedness of Communication

Network communication can be measured by its connectedness, or *density*. Density is a ratio that compares the number of ties or connections between partners reported to the number possible in a network. A network in which all actors are connected to all other actors would have a density of 1.00.

In order to calculate density, we created two matrices, one of people who communicated at least once per semester and another of people who communicated at least weekly. The people who communicated at least weekly we refer to as "regular communicators." In Table 3 we report the density of communication at both these levels for all communication, face-to-face, and electronic communication for 1987 and 1989.

The connectedness of these networks is quite high and remains high, although it decreases for both from 1987 to 1989. In 1987 the connectedness of the network for any communication (at least once a semester) at 0.97 is nearly at the maximum level for density, 1.0. Although it declines to 0.93 by 1989, it is still a network with extremely high density. The connectedness of the electronic communication network, 0.26 in 1987 and 0.61 in 1989, is not nearly as high as that of the face-to-face network,

Table 3   Density Measures

Level of Communication	1987	1989	Change	Z Value ꝉ
At Least Once per Semester				
Face-to-Face	0.96	0.88	−0.08	−3.44**
Electronic Mail	0.26	0.61	+0.35	8.21***
All Communication	0.97	0.93	−0.04	−2.14*
At Least Weekly				
Face-to-Face	0.75	0.59	−0.16	−3.97***
Electronic Mail	0.22	0.42	+0.20	5.00***
All Communication	0.77	0.63	−0.14	−10.18***

ꝉZ values are based on the difference of proportion statistic.
*significant at $p = 0.05$.
**significant at $p = 0.01$.
***significant at $p = 0.001$.
(values calculated using UCINET 3.0)

0.96 in 1987 and 0.88 in 1989. This high level of connectedness is not surprising when we consider that these survey respondents are members of an organization in which most of their offices are located on the same floor, and they are likely to attend meetings together at least once a semester. Therefore, we were more interested in the changes in the network of regular communicators. Here again, we found a similar pattern. The network that includes all types of communication is more dense (0.77) in 1987 than it is in 1989 (0.63). Electronic mail communication reported yields a more densely connected matrix in 1989 (0.42) than in 1987 (0.22) and would appear to compensate numerically for the decline in the connections in the face-to-face network (of 0.75 in 1987 to 0.59 in 1989).

Why, then, does the density of the network of all types of communication decline? More people in 1989 are using both electronic mail and face-to-face communication. Therefore, when you separate these two ways of communicating each redundant tie is counted twice, but when you combine the ways of communicating each tie is counted only once.[9] Of the possible 272 (17 × 16) communication ties,[10] regular communicators reported using 43 fewer ties in their overall communication. Their face-to-face communication declined by 45 ties. Their electronic mail ties increased by 55, but several of these are redundant with to face-to-face ties. Therefore, the increase in electronic mail ties does not fully substitute for the decline in their face-to-face ties. Even though the density of the electronic mail network increases, the density of the overall network decreases. The decline in the density of the matrix based on communicating at least once

a semester shows that some people are no longer communicating at all. The decline in density for the regular communicators shows that some people who used to communicate regularly are communicating less often or not at all.

Cohesiveness of the Communication Network

How crucial are these missing ties to the pattern of communication within the unit? There are various techniques that can be used to explore this. One of these is clique detection. A clique is a group of actors, each of whom is connected directly with all other actors in the group.[11] These cliques are, in network analysis terms, maximally complete subgraphs in an undirected graph.

Table 4 summarizes different patterns of clique size and different numbers of cliques across time and across the different types of communication that we found in our data. The overall network has larger cliques than the face-to-face or electronic mail network because the cliques are made up of people who communicate in any of the four ways included on the survey. Thus, people who communicate only face-to-face and people who communicate

Table 4   Number of Cliques of Size N in Each of the Three Networks

Clique Size	Overall		Face-to-Face		Electronic Mail	
	1987	1989	1987	1989	1987	1989
3	0	0	0	0	4	4
4	0	2	0	1	5	0
5	0	0	0	0	3	8
6	0	0	0	0	0	3
7	0	0	0	1	0	6
8	0	1	0	1	0	0
9	5	4	5	3	0	0
10	2	4	2	4	0	0
11	8	0	8	0	0	0
Total Number of Cliques	15	11	15	10	12	21
Average Clique Size	10.2	8.4	10.2	8.6	3.9	5.3

Note. These are three separate matrices, each representing a network. The overall communication network includes both the other two networks, plus telephone and written communication. Our cliques are maximally complete subgraphs in an undirected graph. Smaller cliques in face-to-face and electronic mail networks are embedded in larger cliques in overall communication. The overall network includes ties from both these networks plus two other forms of communication. Thus, in face-to-face and electronic mail, there are more small cliques than in overall.

only through electronic mail and people who communicate through both could be included in the same clique.[12] As we move from 1987 to 1989, the number of cliques in the face-to-face network declined from 15 in 1987 to 10 in 1989, and clique size contracted from an average of 10.2 in 1987 to 8.6 in 1989. Simultaneously, the number (12 in 1987 and 21 in 1989) and size (average of 3.9 members in 1987 and 5.3 members in 1989) of electronic mail cliques expanded. The increase in number and size of electronic mail cliques did not offset declines in the face-to-face network cliques. The overall communication network reflected fewer and smaller cliques in 1989 (11 cliques averaging 8.4 members) than in 1987 (15 cliques averaging 10.2 members).[13]

Cliques can vary not only in size and in number, but in the degree to which they overlap, or share members, with other cliques (Scott 1991). As Table 5 demonstrates, many of our groups do overlap. Further, certain actors appear more central in connecting many or most of the cliques. Other actors are more peripheral, serving to connect one or two cliques. Pairs of actors who are members of the same cliques are called co-members. High co-membership scores indicate actors who link several subgroups. Co-membership declined for all except three actors between 1987 and 1989 in face-to-face and all communication networks. It increased for 12 actors in the electronic mail network.

In 1989 the face-to-face and all communication networks contain fewer cliques than in 1987, and these cliques are smaller. The cliques, also, are coupled less tightly to other cliques. These measures show that face-to-face communication and overall unit communication were less tightly linked in 1989 than in 1987. As electronic communication was adopted, more regular communicators used it, as they simultaneously used less face-to-face communication. The resulting pattern does not simply reflect a transfer of communication from one form to another. Not only did the number of connections among actors in the network decrease, but the missing ties change the pattern of overall communication so that the remaining communicators were less tightly connected to one another.

We wondered whether these changes were distributed equally across the different purposes for communicating that appeared on the 1987 and 1989 surveys: Mostly Work, Mostly Personal, Mixed, and Greetings. Classifying the data by purpose allows us to partition the network into four subgroups, one for each purpose. Densities for these four subgroups are reported in Table 6. The overall communication density is identical to the one reported in Table 2 for overall weekly communication. Density among people reporting that their communication was

Table 5   Individual Number of Co-memberships

	Overall			Face-to-Face			Electronic Mail		
Person	1987	1989	Δ	1987	1989	Δ	1987	1989	Δ
A	15	7	−8	15	7	−8	9	9	0
B	15	10	−5	15	9	−6	0	5	+5
C	4	2	−2	4	2	−2	4	2	−2
D	15	7	−8	15	7	−8	4	10	+6
E	4	7	+3	4	6	+2	2	6	+4
F	3	2	−1	3	2	−1	3	6	+3
G	3	5	+2	3	5	+2	2	15	+13
H	5	3	−2	5	3	−2	3	2	−1
I	12	10	−2	12	9	−3	3	7	+4
J	13	7	−6	13	7	−6	3	7	+4
K	10	9	−1	10	6	−4	3	6	+3
L	10	7	−3	10	7	−3	1	15	+14
M	15	7	−8	15	7	−8	0	3	+3
N	2	3	+1	2	3	+1	0	4	+4
O	9	1	−8	9	1	−8	3	1	−2
P	12	3	−9	12	3	−9	2	2	0
Q	6	1	−5	6	0	−6	0	2	+2
Mean change in co-membership		$\bar{x} = -3.6$			$\bar{x} = -4.1$			$\bar{x} = +3.5$	
Number of actors with increase in co-membership		3			3			12	
Number of actors with decrease in co-membership		14			14			3	

(values calculated using UCINET IV)

Table 6   Density of Communication by Purpose

Purpose	1987	1989	Change	Z value ᵛᵃ
Overall	0.77	.63	−.14	−10.18***
Work	.19	.14	−0.5	−1.57 ns
Personal	.05	.04	−.01	−.56 ns
Mixed	.36	.38	+.02	.48 ns
Greetings	.17	.06	−.11	−4.02***

ᵛᵃZ values are based on the difference of proportion statistic.
***significant at *p* 0.001.
ns not significant at *p* = 0.05.

mostly personal or mixed remained relatively unchanged. Communication reported as mostly work declined from 0.19 to 0.14, but this was not statistically significant at the 0.05 level. Greetings declined most dramatically, moving from a density of 0.17 to 0.06. This difference was statistically significant at the 0.001 level.

We also examined these purpose-based subgroups of the data by the form of communication used. In Table 7, we report the number of communication ties and the number and size of the cliques by purpose and form of communication used. Communication classified as mostly work decreased in face-to-face communication (from 52 pairs to 33 pairs) and increased in electronic mail communication (from 12 to 31 pairs), but the increase in electronic mail communication for this purpose did not offset the decline in face-to-face communication. The number of partners communicating for this purpose declined by 27%, from 52 pairs to 38 pairs, between 1987 and 1989. Communication classified as mostly personal and mixed remained relatively stable overall, with some increase in the use of electronic mail to augment rather than replace face-to-face communication for mixed purposes. The most dramatic change occurred in communication classified as greetings, which declined 63% between 1987 and 1989, from 46 pairs to 17 pairs of respondents.[14]

If people are not proximate, they are less likely to greet one another (Monge and Kirste 1980). We found that the

Table 7   **Communication Connections by Purpose**

Purpose of Communication	1987		1989	
	No. of Lines	No. of Cliques (Size)	No. of Lines	No. of Cliques (Size)
Work (1)				
Face-to-Face	52	15 (5)	33	9 (4)
Electronic Mail	12	1 (3)	31	6 (3)
Overall	52	15 (5)	38	10 (4)
Personal (2)				
Face-to-Face	14	2 (3)	10	1 (3)
Electronic Mail	5	0	7	1 (3)
Overall	14	2 (3)	10	1 (3)
Mixed*				
Face-to-face	96	28 (6)	102	21 (7)
Electronic Mail	38	5 (5)	75	17 (5)
Overall	98	25 (6)	102	21 (7)
Greetings (4)				
Face-to-Face	45	10 (3)	17	3 (3)
Electronic Mail	4	0	1	0
Overall	46	10 (3)	17	3 (3)

*1989 data included a new category mostly work and some greetings. See endnote 9
(values calculated using GRADAP version 2.0)

people in our study were more likely to be working at home in 1989 than they were in 1987. We asked in both years where people worked most of their time and where they worked "2nd-most" of their time. In 1987, all our respondents listed their unit office as either the place where they spent most of their time or 2nd-most of their time. In 1989 this figure dropped to 94%. The most dramatic change was in the number of people who listed home as the place where they spent the "2nd-most" of their working time. Home increased from 53% in 1987 to 71% in 1989. This shift means that people were less likely to run into one another and make greetings possible.

Summary

During the time that we gathered data in this organization, several changes in intraorganizational communication took place. The use of electronic mail increased, the use of face-to-face and all other media decreased, and the overall amount of communication in the organization decreased. The network analysis reveals that some of the decrease in communication occurred because some people stopped communicating regularly, while others stopped communicating even once a semester. Most of the communication lost involved greetings. Some of this loss may be attributed to the fact that more people were working at home in 1989 than in 1987.

Additional information suggested that there was also a decrease in perceptions of connectedness and community in the unit. According to minutes of unit meetings, members say increasingly that they feel the unit is no longer as connected as it once was. Unit members say that they do not know what other people are doing. It seems likely that the decrease in communication that we found contributed to this.

In any naturally occurring experiment there are many possible factors that may affect observed effects. Thus, we hesitate to say that electronic mail *caused* organizational communication to decline. This organization was experiencing increasing centrifugal forces as its members aged and became engaged in more activities outside the unit. It is possible that electronic mail helped keep organization members in touch with one another. In fact, its use might have contributed to the stability of work and mixed communication despite forces that might have led to their decline. One person we interviewed, for instance, said "If [the Unit] were not so well wired I wonder how I would have reacted when I moved [to another building for an administrative position]. Perhaps I would have communicated less. Perhaps I would have run back and forth more" (NF 1989).

We do, however, find that our data tell a convincing and credible story. Increased use of electronic mail and more time spent working at home contributed to a decline

in greetings. Further, we think there are important organizational implications of this shift that need to be considered.

A Communication Typology

The work of Erving Goffman (1963) and Anthony Giddens (1979, 1984) provided us with a conceptual base for thinking about these organizational implications. Giddens suggests that co-presence is an important element of social integration. He cites Goffman's work on civil inattention to support this assertion. Goffman points out that how we handle being present but not available is important to the development of social trust. These theories led us to believe that an exploration of unavailability is important to the study of the organizational effects of increased electronic mail use. In the following discussion we present all four cells of a two × two table based on presence and absence, availability and unavailability.

Absence Availability. A fundamental characteristic of electronic mail is that it allows people to communicate easily when they are not physically proximate, and it can occur asynchronously. These features facilitate communication among people who are physically distant because they can receive communication without being present in space and time as required for face-to-face communication or in time as required for telephone communication (Sproull and Kiesler 1991). By facilitating communication between people who are not geographically or temporally proximate, electronic mail can support or increase absence availability. One person in the unit summarized this effect when, asked how he would feel about not using computers for intra-organizational communication, said, ". . . with colleagues about research I would miss it 'absolutely.' With colleagues about administrative stuff it is especially nice, much quicker than meetings, a more efficient use of time" (NQ 1989).

Presence Availability. As the literature cited earlier (Rice 1984, Sproull and Kiesler 1986, Culnan and Markus 1987, Zuboff 1988, Schmitz and Fulk 1991, Walther 1992) established, there are substantial advantages to being available and face-to-face for the performance of some tasks. Sproull and Kiesler point out that "Although electronic group mail reduces the amount of meeting time needed for coordination activities, it doesn't eliminate the need for face-to-face meetings. Face-to-face meetings are particularly important in getting a group started, in negotiating issues and in problem solving" (1991, p. 30).

A crucial feature of presence availability encourages unplanned, casual conversation. When people are face-to-face, they may engage in conversation simply because they are there (Festinger et al. 1950, Farace et al. 1977). This is particularly true when people must wait or otherwise mark time together. Even total strangers who spend time waiting in close proximity (e.g., in lines) may begin to converse, despite social conventions that discourage talking to strangers.

In organizations, social conventions encourage our inclination to talk if we are proximate even for short periods of time. For instance, we greet each other and sometimes engage in casual conversation while we wait for meetings to begin, for the coffee to finish brewing, the mail to arrive, or many other occasions when coworkers find themselves proximate and marking time (Allen 1977, Monge and Kriste 1980). We will call this sort of talking "casual conversation" to distinguish it from conversation in which we intentionally seek out a communication partner to perform some at least partially planned or intentional communication. This casual conversation, generally, is not directed toward a single communication goal. It rambles, and topics unrelated to work as well as work related topics often arise (McGrath 1984). Being present supports unintended casual conversation that arises when people just "hang out." Greetings may consist of simply saying "hi" as people pass one another in the hallway and, shortly we discuss why even such brief encounters are important. Just saying "hi" can lead to further conversation, however. Greetings break the ice and make casual conversation more likely.

It is probable that such casual conversations rarely spawn coauthored papers. Yet, brief, transient, and seemingly trivial encounters, such as those we call casual conversation, are important for organizations. They provide opportunities for organizational members to expand their contact and their knowledge about other people (Festinger et al. 1950, p. 169). They also support the formal communication channels in a number of ways. March and Sevon (1984) have pointed out the importance of gossip for keeping communication channels open so that they are available when needed for substantive purposes. Katz and Kahn (1978, p. 449) suggest that grapevines and gossip can provide better and faster information than more formal communication. Hage also discusses the importance of unscheduled communication for the processes of feedback and socialization, particularly in organizations with diverse specializations (1974, Ch. 9 and 10). Thus, evidence of a reduction in casual conversations or in the opportunities for casual conversation should be a cause for concern.

Research suggests that electronic mail decreases the need for people to be co-present, and by implication, decreases opportunities for casual conversation. The key ingredient facilitating casual conversation, "hanging out"

together, is missing from electronic communication, which requires planning or intent. Users sign on and deliberately contact each other. Even in large distribution chains or electronic bulletin boards, there is intent to communicate with someone, even if the specific person is unknown or unplanned. Being available electronically is thus qualitatively different from being available in the same geographic and temporal space. While we could imagine some casual conversation that might arise, particularly on electronic bulletin boards, such conversations are unlikely to occur except in conjunction with some other, planned or intentional communication. In our data greetings do not occur very often on electronic mail. They occur mostly in face-to-face situations.

Presence Unavailability.   When people are co-present but unavailable or not interested in establishing involvement in a face-to-face encounter, they must signal unavailability. Without these signals, one's presence might, probably would, be interpreted to imply availability. These behaviors include signals that one is not eavesdropping on others' conversations (civil inattention, to use Goffman's 1963 term), signals that one does not wish to initiate a face-to-face encounter and signals that one wishes to terminate a face-to-face engagement. The ways in which a person provides these signals establishes his or her trustworthiness as a communication partner and can establish or jeopardize the other person's value as a communication partner to others in a social setting. The publicness of this signaling is an essential ingredient of the social function it serves.

The relation of greetings to potential casual conversations is not the only reason for valuing greetings. Goffman's work provides reasons for valuing greetings, in themselves. Goffman (1963) develops the notion of engagement enclosures to explore ways people carry on conversations in public places without including everyone who is present. In order to do this, when people are proximate they must signal that they understand that they are not part of a conversation occurring near them if it would be socially unacceptable to intrude. Goffman (1963) calls this "civil inattention." It involves averting the eyes, turning the body slightly, or giving other cues to indicate tactful respect for boundaries of an encounter between other members of a gathering. Similarly, when people are present, but do not wish to engage in an encounter or wish to terminate their current engagement, they use other subtle, often nonverbal, cues to indicate disinterest, disengagement, or unavailability. They might give brief, rapid responses, or look at papers while talking, or remain standing, or edge toward the door, or use various other behaviors to signal their unavailability or lack of involvement.

When people observe accepted social conventions about signaling unavailability, they not only reinforce social norms, but they establish their social reputation as trustworthy and valuable communication partners (Goffman 1963). As Goffman points out, when people signal that they do not wish to engage in mutual involvement with another person, bystanders may observe this exchange. Then, the bystanders may question whether that person is worth their time and attention. When people are discrete about leaving an encounter of mutual involvement, they establish themselves as trustworthy communication partners whose actions will not unduly subject others to questions about their communication worth. He suggests that the way people handle being unavailable when they are present is critical for both their own and their partner's social reputation, and is a critical mechanism for establishing trust, or conversely arousing distrust.

Giddens (1979, 1984) has developed a distinction based on the importance of co-presence. He suggests that there are two ways to maintain or reproduce social systems: social and system integration (1979). Social integration requires that people be simultaneously in each other's presence (co-present); system integration does not. Social integration is based on mutual observation of and response to behavior which, over time, allows people to understand one another's behaviors and reactions. System integration (which does not require co-presence) is based on knowledge of general practices. One might think of the distinction between social and system integration as comparable to the differences in the expectations about ways a member of the general category "professor" might appropriately respond to requests from a member of the general category "student" (system integration) as opposed to expectations about ways a specific faculty member responds to requests from a specific student (social integration). Giddens states that it is not knowledge about the conventional ways to signal disengagement (system integration), but expectations based on experience and observation of the ways specific people respond in particular circumstances that form the foundation of social integration (Giddens 1984).

When people shift some of their communication from face-to-face to electronic mail, co-presence is likely to decrease, as happened in the unit we observed. Organizations in which this shift occurs decrease opportunities for social integration. Although system integration can maintain and reproduce social systems, there are differences in the specificity of practices maintained and reproduced through social integration. Goffman's work on civil inattention helps us to see exactly what some of those differences are.

Electronic mail reduces the need for the signals of civil inattention. Distribution lists, cc's, reply to all, and other features of electronic mail provide opportunities for observing other people's interactions. Some of the more complex situations requiring civil inattention or disengagement, however, are not, or not yet, possible on electronic mail. A common example occurs when you are having a conversation and someone else walks by and says "hi" and indicates that he or she would like to talk with you. Such situations are not only very complex but take place in "real time," giving the participants no opportunity to reflect on the immediate situation. Interactions that take place through electronic mail are different in that the observers are less evident, and people have more time to think about their interactions. Therefore, electronic mail decreases the risk that an encounter may damage a person's social reputation and decreases the opportunities to establish social credentials and build a sense of trust between people. Despite the potential consequences of this, little empirical work on electronic communication directly explores this issue.

Absence Unavailability.   This refers to inaccessibility of people when they are not co-present and when they do not use communication technologies or other means to bridge this gap. In earlier times, without the telephone, fax machines, beepers, and electronic mail, people were assumed to be unavailable when they were absent. Maintaining absence unavailability required inaction, rather than action. In the age of the new communication technologies being unavailable is more ambiguous. New communication technologies and new options on these technologies alter the responsibilities associated with being unavailable. Beepers and cellular phones allow people to be contacted anywhere, anytime. Many electronic mail systems allow users to notify people who try to contact them during a time when they will not be checking their messages. Outgoing messages on voice mail systems can be changed readily to let callers know if incoming messages will not be picked up regularly or soon. Now when a person does not respond, it is not clear if the technology has failed, if the person is not responding for some reason, or if the person is truly unavailable.

The importance of absence unavailability in organizations is basically unexplored. Signals of absence unavailability tend to be ambiguous and private. For these reasons absence unavailability does not perform the same function of establishing social trustworthiness that presence unavailability can. At the same time, receiving a signal of absence unavailability may not be publicly embarrassing for the recipient. Thus, the risk of a public rebuff or snub is much lower when absence unavailability occurs than when presence unavailability is signaled. There is much room for future research on this category.

Conclusions

In this study, we found increased use of electronic mail and decreased use of face-to-face communication. The increases in electronic mail did not offset the decreases in face-to-face communication, so overall communication declined. Using network analysis, we were able to specify that the decline in overall communication resulted from some communication partners who used to communicate on at least a weekly basis, who no longer did so. Further, we were able to identify specific purposes for communication that were most affected by this decline in communication. Most of the decline in overall communication involved greetings.

Our findings suggest that by increasing absence availability, electronic mail can (although it is by no means certain that it will) reduce co-presence. This, in turn, decreases the opportunities people have to greet each other or engage in casual conversation. In organizational contexts in which electronic mail does this, the work of Giddens and Goffman suggests that there are important organizational implications.

Some of these implications involve reducing casual conversation. Others involve fewer opportunities to signal in social settings our communication trustworthiness, especially when we are co-present but unavailable for communication. Exploring these implications requires that we pay attention to differences between availability and unavailability, as well as differences between presence and absence.

We have studied an electronic medium that developed fairly early on and has been in use for some time. New forms of electronic communication are emerging rapidly. Electronic chat rooms, electronic discussion groups, the internet, and innovations yet unknown continue to change the face of organizational communication. The issues we raise of how people deal with availability and unavailability, and the impact on organizational dynamics, are potential issues for any electronic medium. We suggest several specific areas that need further research.

The literature on electronically mediated communication has focused its attention primarily on differences between presence availability and absence availability. We suggest that research exploring the differences between these two conditions of communication needs to pay attention explicitly to the importance of casual conversation. Architects are designing buildings to increase the likelihood that people will "run into" one another during their work day (Sullivan 1996, Dalton 1991, Walker

1992). Electronic chat rooms, the internet, or other forms of electronic communication may provide opportunities for some forms of casual conversation that might serve some of the same purposes as co-present casual conversation. Differences between "running" into someone electronically instead of face-to-face need to be studied systematically.

Much less research attention has been paid to the value of signaling civil inattention and other forms of presence unavailability. As we increase absence availability, we potentially decrease the need to be present when we are unavailable. For example, as people work at home more often or in other networked locations, there is less need to signal unavailability in social settings. But this also reduces opportunities to establish one's social trustworthiness.

The effect of this change needs to be studied systematically. Several questions occur to us. For example, when we signal unavailability in social settings less often, does the significance or importance of each signal increase? This might suggest that minor missteps or awkward exchanges are more important and that more diligence or attention to detail in social settings will be necessary in networked organizations. When we signal unavailability less often, will our skills become "rusty" or at least less automatic? In other words, do these skills require regular practice to remain fluid and natural? If each signal becomes more important as the number of signals decreases and we also become less adept at handling these social situations, what are the implications for our sense of trust in our communication partners? This suggests that Giddens' distinction between social and system integration may have profound implications for organizations. Research on these and other possible effects of electronic communication on presence unavailability is needed, especially as different types of electronically mediated communication settings (e.g., chat rooms, electronic discussion groups, internet links) proliferate.

Changes in absence unavailability have been largely ignored in research on electronically mediated communication. As we noted earlier, absence unavailability is more ambiguous in the age of electronically mediated communication. It is impossible for us to know whether the technology failed in some way, whether the person is for some reason out of contact with the technology or whether the person is deliberately ignoring our communication overtures. Thus, the distinction between absence availability and absence unavailability is blurred. Are we being irritatingly insistent if we initiate a second contact when we receive no response? Or, are we simply guarding against the occasional system failure, lack of paper in the fax machine, or message machine tape that became too worn to decipher the message? How do we respond in these situations? What are the implications of our different responses? Again, research on these questions is needed.

As academics, we can compile a wish list for additional research and exploration. Managers and other members of organizations, on the other hand, cannot wait for future findings. Our research helps to establish that communication not only transmits substantive information, but performs valuable functions related to social and system integration. While we do not advocate an office in which workers chat endlessly, casual conversation can perform valuable functions that, in the long run, facilitate organizational activity by establishing or maintaining relationships between workers.

Handy (1995) has provided some useful advice based on his analysis of the virtual organization, a more extreme version of what we have been talking about. He claims that it is essential to increase trust throughout organizations as organizations become more virtual or networked.

> Paradoxically, the more virtual an organization becomes, the more its people need to meet in person. The meetings, however, are different. They are more about process than task, more concerned that people get to know each other than that they deliver. . . . Work and play, therefore, alternate in many of the corporate get-togethers that now fill the conference resorts out of season. These are not perks for the privileged; they are the necessary lubricants of virtuality . . . (Handy 1995, p. 46f).

We encourage managers to treat opportunities for casual contact as an important part of work. Our research suggests some reasons that the casual contact that occurs not only at conference resorts but also at such places as the coffee pot, the lounge, the hallway and the company picnic is important in building trust. Not only do such settings encourage casual conversation, but they also place people in circumstances in which they must signal that they are *not* available to chat. The ability to do so in ways that do not unduly embarrass the potential partner is an essential element in social interaction.

Reducing the number of people who greet each other is likely to decrease the number of opportunities people have to say "hi" and also decreases the number of opportunities for them to demonstrate that they can signal unavailability in social settings. In other words, not only do they have fewer opportunities to say "hi," they have fewer opportunities to signal that they can be trusted to signal that "hi" is all they have time to say or limit what they have to say to "hi," when the other person signals that is all they have time to say at this moment. The importance of these interactions is the reason we have come to the conclusion that saying "hi" really does matter.

Acknowledgment

Endnotes

[1]Both authors contributed equally to this paper. We alternate first authorship from one paper to the next.

[2]The support included purchasing computers and modems for unit members who needed them, technical support, instructional sessions, and a manual of commonly used commands and standard function key definitions. Shifting from paper memos to electronic distribution was a two-step process. At first, intraunit communication was available electronically, but paper copies were distributed to physical mailboxes. During the second year of the experiment, memos, announcements, and other intraunit notices were available only electronically.

[3]The 1986 questionnaire was administered to 45 people and returned by 37, for a response rate of 82%. In 1987, 28 of 45 questionnaires were returned (response rate of 62%), and in 1989, 35 of 40 questionnaires were returned (response rate of 87%).

[4]The frequency designations respondents could use were: never, at least once per semester, 1–5 times per semester, 6–10 times per semester, every week, several times per week, and daily or several times per day. For 1987, respondents reported 751 communication transactions out of 765 possible transactions (17 respondents times 45 partners, as respondents could, and some did, report communication with himself or herself). For 1989, they reported 666 communication transactions out of 680 possible transactions (17 respondents times 40 partners). We multiplied the responses by the maximum frequency (80) that could be reported for daily communication during a semester, multiplied by the cases. This produced 6,008,000 ($80 \times 751 \times 100$, because respondents reported percentages) possible communication units for the 1987 survey respondents, and 5,328,000 ($80 \times 666 \times 100$) possible communication units for the 1989 survey respondents.

[5]See Knoke and Kuklinski (1982) for an excellent discussion of sampling problems in network analysis.

[6]Problems of nonresponse combined with turnover among unit staff precluded any further attempts to collect network data about the "same organization." The size of our network would have contracted still further, leaving us with little useful data.

[7]In 1987 and 1989 these 17 people reported 275 communication transaction out of 289 possible (17×17), producing 2,200,000 possible communication units for each year.

[8]Corman and Bradford (1993) report that respondents' perception of their role in an organization introduces systematic bias into self-reported communication data. We feel that focusing on change over time rather than absolute levels of communication provides some protection against this source of bias in the data. For example, if our respondents inflated their communication involvement because they perceived themselves as important in the unit (as Corman and Bradford's

work indicates they might), we assume that they did so on both questionnaires.

[9]We mention electronic mail and face-to-face only because these are the main ways that people communicated. Of course, the same would be true for any of the ways of communicating.

[10]This excludes communication by the respondent with himself or herself.

[11]For the clique analysis in this study, we decided that communication channels used on at least a weekly basis were used regularly enough to be considered part of the routine or institutionalized features of the unit and thus serve as a reliable mechanism for disseminating and exchanging information. Therefore, the subsequent analyses are reported for the regular communicators only.

[12]We use face-to-face and electronic mail here because those are the main ways that people communicated. Of course, the same would be true of people who communicated by telephone or through writing.

[13]A decline in both size and number of cliques is necessary for us to argue that the network is less connected. An increase in clique size but a decrease in the number of cliques would be ambiguous. Likewise, more cliques but smaller sized cliques would be difficult to interpret.

[14]The categories provided for survey respondents on the 1987 survey were Mostly Work, Mostly Personal, Mixed, and Greetings. In answering the 1987 survey, a few respondents created their own category, mostly greetings and some work. Unfortunately, in 1989 the category was included as a fifth possible response choice, and several people used it. Obviously, when respondents are provided with a category, more use it than when they must invent it. Therefore, mostly greetings and some work increased from 4 reported communication ties in 1987 to 38 in 1989. This change in categories presents a problem when we attempt to compare purpose of communication across time. We chose to classify this category as mixed and group it with that category for our analysis. By doing this, mixed communication remains virtually unchanged from 1987 to 1989, as does personal communication. We believe this combination of the categories in the 1989 data most closely reflects the responses we would have obtained had the categories remained constant.

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