

Computer Communication and Organizational Commitment: Tracing the Relationship in a City Government

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Various theories and management policies suggest that there should be a positive relationship between communication and commitment to the organization. However, support for that relationship remains equivocal. We report the results of a questionnaire on communication and commitment filled out by 376 employees of a mid-sized city government. They were asked about the mode and frequency of their communications within the organization and about their commitment to the city government. Consistent with our hypotheses about the nature of computer-mediated communication, use of computer mail and bulletin boards predicted organizational commitment, but use of the telephone and paper modes of communication did not. In addition, those most likely to benefit from the immediacy and memory of computer communication—shift workers—evidenced a stronger relationship between computer mail use and commitment than did regular employees. Two mechanisms for mediating the relationship between communication and commitment were evaluated. Evidence supports active participation in communication as a mediating mechanism in the relationship between communication and commitment. The informational value of communication does not appear to be important in this regard.

Television advertisements that encourage us to “reach out and touch someone” are based on the assumption that by communicating with others, we will strengthen our relationships with them. This assumption is widespread in managerial folklore and forms a significant part of some organizational and social psychological theorizing. Theorists agree that communication is intimately related to a host of variables reflecting some aspect of commitment to groups or individuals.

In organizations, involvement in communication networks is said to affect employees' membership in subgroups and informal cliques (Becker, 1960), attitudes toward the organization (Buchanan, 1974; Patchen, 1970), participation in decision making (Hall, 1977), and morale (McLaughlin & Cheatham, 1977). Roberts and O'Reilly (1979), after examining the correlates of communication network involvement among

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Navy personnel, concluded that participants in a communication network "are generally more satisfied with their jobs, more committed to their organizations, and higher performers [than are isolates]" (p. 54).

Social psychological researchers have also predicted, and often found, a relationship between communication and commitment. Cartwright (1968) has hypothesized that frequent interaction would lead to group cohesion, as long as that interaction is positive in nature. Festinger, Schachter, and Back (1950) found that people who lived closer to each other (and therefore communicated more often) were more likely to develop friendships (see also: Byrne & Buehler, 1955; Caplow & Forman, 1950; Nahemo & Lawton, 1975; Whyte, 1956). Even the mere expectation of future interaction with a person has been shown to increase commitment (Darley & Berscheid, 1967; Berscheid, Boyce, & Darley, 1968; Kiesler, Kiesler, & Pallak, 1967). Thus, from a variety of perspectives, communication and commitment are related.

Empirical Research on Communication and Organizational Commitment

Organizational commitment has been generally thought to be the extent to which an employee is committed to the values, goals, and success of his or her employing organization. Mowday, Steers, and Porter (1979) have defined organizational commitment as containing three aspects: (a) belief in the organization's goals and values, (b) a willingness to exert considerable effort to help the organization, and (c) a strong desire to maintain membership in the organization.² Both studies that have focused explicitly on the relationship between communication and organizational commitment found only equivocal relationships. Roberts and O'Reilly (1979) observed three different content-based networks—position in hierarchy, friendship, and helping networks—and found that only involvement in the helping network was associated with organizational commitment. Eisenberg, Monge, and Miller (1983) found that communication network involvement was related to organizational commitment, but only for people who were not very involved in their jobs. It seems that the relationship between communication and organizational commitment is sporadic at best, occurring only for certain kinds of communication or certain kinds of employees.

²It is interesting to note that these aspects are similar, if not identical, to definitions of group cohesion used in the social psychological literature (see Forsyth, 1983, p. 349-352).

One source of difficulty in establishing the communication-commitment relationship is the multifaceted nature of communication. Communication might have very different effects depending upon what it does to connect people in the psychological or informational sense. For example, a routine printed memo from a department head to employees, e.g., "time to get your quarterly reports in," is somewhat useful but probably neither involving nor surprising. Exchanging such memos might not be expected to have much effect on organizational commitment. At the other extreme, a department head might take an employee out to lunch to discuss the quarterly report. This could prove involving for all concerned; both parties may feel special, well informed, and effectual. This kind of communication could easily produce increases in organizational commitment. Since communication and commitment are both multidimensional, it seems reasonable that only certain kinds of communication will be related to organizational commitment.

How does a communication lead to commitment? Social and organizational theorists have specified at least two different paths. It could be that the *information* people receive is the important factor in increasing commitment (Salancik & Pfeffer, 1977, 1978; O'Reilly & Caldwell, 1979; White & Mitchell, 1979) or it could be that active *participation* in the communication network produces commitment (Kiesler, 1971; Salancik, 1977).

In support of the proposition that the information received from communication will increase commitment, Eisenberg et al. (1983) suggest that:

Informational cues about work can influence attitudes by suggesting how a worker should interpret and respond to complex cues, by making features of the environment more or less salient, by aiding in interpretation of needs, and by indicating ways to conform to the work group.... The extension of this framework to the area of organizational commitment would suggest that when a worker receives positive cues about the nature of work in the organization, he or she would become more committed to that organization (p. 183).

Another possible path from communication to commitment involves the active participation of the individual in communication. This relationship could occur in several ways. The ability to make suggestions and

interact with one's peers and superiors may lead people to feel effective in their relationship with the organization (Bandura, 1977; de Charms, 1968) or lead to increased feelings of control in the organization (Rotter, 1966). Or, from the perspective of self-perception (Bem, 1972), the explicit, irrevocable, public act of communicating, made without coercion, might commit the person to the attitudes expressed by those actions. There is experimental data to support the assertion that overt action can produce attitudinal commitment. Kiesler (1971) presents several studies in which positive acts toward another individual or group produce positive changes in attitude toward that group or individual (see also O'Reilly & Caldwell, 1981).

Thus, a communication may have varied effects on organizational commitment depending upon its nature. Certain kinds of communication may have no relationship at all to commitment, and those communications that do may have their effect in at least one of two different ways: by increasing access to information or by increasing active participation. In the next section we argue that, because of its unique characteristics, computer communication is one form of mediated communication that is likely to be related to organizational commitment.

Communication Mode Effects

Recent research (Chaiken & Eagly, 1976, 1983; Werner, 1978) has shown that there are discernable differences in the kinds of communication that take place, and the effects of those communications, depending upon the mode in which they occur. For instance, Chaiken and Eagly (1983) found that the characteristics of the communicator affected the persuasiveness of an audio message, but did not affect the persuasiveness of a written message. In addition, Sproull and Kiesler (1986) found that computer mail provided fewer social context cues to communicators than did other modes, and this resulted in more informal communication.

We expect that because of both its technical and its social characteristics, computer-mediated communication is likely to be related to organizational commitment. In terms of technical characteristics, computer mail is *asynchronous* (like memos, but unlike the telephone, the communicants are not required to be present simultaneously), *text based* (again, like memo, and unlike telephone communication), and *fast* (replies can be transmitted in seconds; more like telephone than memo communication). These technical characteristics minimize the barriers that time and

distance place on communication in an organization and also allow the easy archiving of information sent and received.

The social characteristics of computer mail also differ from other modalities. Status differences are less evident in computer mail (Sproull & Kiesler, 1986; Dubrovsky & Kiesler, 1987), thus making communication among unequals more egalitarian. And unlike memos, communication in computer mail is relatively informal and often personal (Sproull & Kiesler, 1986). These technical and social characteristics combine to provide a medium of communication that is convenient and informal, providing increased access to organizational information and easier contact with a wide range of people in an organization. Thus, we expected that because of its nonroutine, informal, and personal nature and its advantages of access and memory over the telephone, computer communication might be more closely related to organizational commitment than would either telephone or memo communication.

Computer communication also provides an interesting arena in which to test competing hypotheses about the nature of the communication-commitment relationship. If computer communication provides information, which in turn increases commitment, we would expect computer communication to correlate both with feelings of being informed and with organizational commitment. In addition, if information receipt is a precursor of commitment, one would expect that the number of computer messages *received* (rather than sent) would predict commitment. If these predicted correlations are present, we cannot infer that information receipt produces commitment (because correlation does not imply causation). However, if the correlations are not found, that can be counted as a strike against the informational theory of commitment (since causation does imply correlation).

If, on the other hand, it is active participation in communication that produces organizational commitment, we would expect that the number of computer messages *sent* is the variable that would predict commitment. Again, not finding the predicted correlation will allow for a possible falsification of this explanation, while finding the correlation will only allow us to say the data are consistent with, but do not confirm, the relationship.

In order to explore these hypotheses we asked the employees of a mid-sized city government to fill out questionnaires indicating how often they used each of three different communication modalities: telephone, memo, and computer mail. These employees were also asked to indicate their commitment to the city government.

Description of the City Government

The city government studied is a mid-sized city (population 88,000) in a western state, located near the Rocky Mountains. The city government consists of 11 departments and 850 employees, 44% of whom are considered information workers. They have a city council government, with a city manager as the top administrator. There are 600 employees (70.58% of total) who have accounts on the city's mainframe computers, and thereby have access to a flexible and relatively easy to use the computer mail system. Electronic mail has been available to every department in the city for at least 3 years. The computer mail system is used to transmit announcements and messages to other employees, and is often the only method of distributing information. Much of the traffic on the system consists of short exchanges of information and suggestions about work-related matters. All employees are expected to check their electronic mail at least once a day.

*Method**Sample*

In the fall of 1986, a questionnaire was sent to all employees of the city government who had accounts on the city's mainframe computer (and thus access to the mail system). The questionnaire indicated that a drawing (for \$100) would be held for those who completed the questionnaire and returned it. A pre-addressed, stamped envelope was attached to each questionnaire, with the address being that of the researchers, not the city. Three hundred seventy-six out of 600 questionnaires were returned (62.67%). This response rate is higher than typical rates found in mailed questionnaires, which vary from 33.7% to 58.5% (Heberlein & Baumgartner, 1978). It is also higher than the average response rate (53%) found in organizational surveys (Sproull, 1986). The respondents were from every department in the city: city attorney, city clerk, city council, city manager, computer center, development, facilities, finance, fire, library, all utilities, municipal court, parks and recreation, and police. The sample was split about evenly between males (52%) and females (48%). The average length of respondents' employment by the city was 8.25 years (ranging from 1 month to 36 years). Given the relatively successful response rate and the expressed attitudes of the respondents (see the

section on attitudes in the results), it seems likely that our sample is representative of the electronic community in the city government.

The Questionnaire

The questionnaire had four categories of items. The first consisted of personal information about the respondent. The second asked a series of questions about computer use in the organization, while the third category consisted of questions about communication in various modes. The fourth category contained items relating to attitudes about work and organizational commitment.

The personal information asked of respondents included gender, age, number of friends in the organization, tenure, position, and department. The information about position and department was used, along with an organizational chart, to construct a measure of the number of supervisory links between each individual and the city council. In the section on computer use, respondents were asked to answer a series of yes/no questions about the benefits they received from using the computer system, and were asked about their familiarity with computers and the extent of their use of computers in their daily routine.

In the section on communication, respondents made estimates of the number of computer mail messages they sent and received each week. Measures of computer and telephone communication were computed as the sum of seven 3-point scales. These scales asked how often (never / weekly / more than once a week) the respondent used the medium to: (a) schedule work, (b) talk about work with one other person, (c) talk about nonwork matters, (d) talk about work with a group of people, (e) transmit documents or data, (f) read a bulletin board, and (g) post on a bulletin board. The last three items were not relevant to telephone communication and they were dropped for that measure, making the telephone-use scale a sum of four 3-point scales. By summing the responses to these scales for each mode, we obtain a compound scale for each mode that is a combined measure of *amount* of use and *diversity* of use.

In the section on organizational attitudes, respondents were asked to indicate (on a 10-point scale) how informed they felt about what was going on in the city. Commitment to the city government was scored as a sum of three 10-point scales that asked (a) how much a "part of the city" the respondent felt, (b) how much the respondent would be "willing to go out of the way to help the city," and (c) how likely the respondent was to leave the city government in the next year. Thus, the commitment scale

ranges from 3 to 30. It includes one face-valid item and two items (b and c) representing the Mowday, Steers, and Porter (1979) definition of organizational commitment.³

Results

Computer Use

In order to adequately test the relationship between computer communication and organizational commitment, we needed to make sure that there was a sufficient amount of traffic in the computer mail system to warrant its comparison to telephone and memo usage. We think the following profile establishes this.

Experience. Those users who responded to the questionnaire were, on average, moderate to heavy users of computers. Approximately 77% of the respondents indicated they worked on the computer for 1 hour or more a day. The average usage per day was 2 hours, 50 minutes. Only 4% indicated they never use the computer.

Computer mail use. A great deal of traffic occurs in the city's computer mail system. Most respondents (92.2%) reported they send or receive at least one message per week. The average number of messages received per week is 16.07 while the average number of messages sent per week is 7.58. Thus, people receive on average, just over twice as much mail as they send. This can probably be attributed to the use of computer distribution lists and "carbon copies" whereby one message is sent to many people. Only 6.7% indicated they never use computer mail and 9.38% indicated they never send mail, but do receive it.

Attitudes about Computing

When asked if electronic mail helped them to "participate in decisions," 51% of the respondents answered yes. A majority, 68.9%, felt that "things happen faster as a result of electronic communication." Only 21.6% felt that they had made new personal contacts as a result of

³The correlation between items 1 and 2 was reasonably high ($r = .57$), but the item asking how likely the respondent would be to leave the city government was uncorrelated with the other 2 items (both r 's approximately .01). Given the theoretical definition of organizational commitment, we felt it best to include the third item in the index, despite its low correlation. However, the low correlation with the other items supports the position taken by some (Reichers, 1985) that intention to quit or stay constitutes a separate construct from organizational commitment.

electronic communication, but 65.2% felt that they received new information electronically that they would not have obtained otherwise. Respondents were not uniformly positive about the effects of electronic communication. A narrow majority (59%) answered "yes" to the question "In your experience, does electronic communication have any negative effects?"

Commitment and Communication Effects

What is the relationship of each mode of communication (computer, telephone, memo) to organizational commitment? First-order correlation coefficients among communication, commitment, and feelings of "being informed" are presented in Table 1.

It can be seen from this table that computer communication is positively related to organizational commitment, and telephone communication is marginally related. In addition, computer communication is positively related to feelings of "being informed," while neither of the other modes are so related.

However, in order to accurately assess these relationships, the influence of other possible variables must be taken into account. Persons who are of high status in an organization may communicate more and are usually more committed than those low in status. In addition, persons who have many friends in an organization may be more likely to engage in communication and more likely to be committed to the organization. The causal direction of these relationships is unclear (causality may be bidirectional here), but because multiple regression sorts out the relative contribution of each variable in the equation, it will allow us to statistically control for these influences while examining the relationship of mode of communication to commitment.

Table 2 presents the results of a multiple regression of organizational commitment on mode of communication while controlling for four possible contributing factors: number of friends in the organization, gender, position in the organizational hierarchy, and tenure in the organization. All further regressions will include these controlling factors. Position in the hierarchy is the only significant predictor of organizational commitment. Among the modes of communication, computer communication is a marginally significant predictor, while the beta weights of the other two modes are not significantly different from zero.

Shift work, communication, and commitment. Because computer communication provides a communication link that is not affected by time

Table 1

Overall Correlations and Correlations Split by Shift Work Status

	Organizational commitment	Informed	Computer	Telephone
How informed do you feel?	.427***			
Computer com- munication	.182***	.135**		
Telephone com- munication	.088	.018	.158**	
Paper com- munication	.032	0.63	.114*	.385***

Correlations Split by Shift Work						
Shift workers (N = 76)				Nonshift workers (N = 296)		
	2	3	4	Commit	2	3
Commit						
2) Informed	.330**			.432***		
3) Computer	.335**			.163**	.164**	
4) Telephone	-.025	.125		.104	.031	.178**
5) Paper	-.032	-.147	.431***	-.012	.066	.126*

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Overall Regressions of Organizational Commitment

Dependent Variable: Organizational Commitment					
	<i>F</i>	<i>df</i>	<i>p</i>	<i>R</i> ²	
	4.55	328	.0001	.09	
Parameter Estimates					
<i>Variable</i>	<i>df</i>	<i>Beta</i>	<i>T</i>	<i>p</i> > <i>T</i>	
Intercept	1	17.09	7.34	0.00	
# friends	1	0.01	0.32	0.75	
Gender	1	0.37	0.62	0.54	
Org. position	1	-0.98	-4.51	0.00	
Tenure	1	0.00	-0.33	0.74	
Computer communication	1	0.14	1.67	0.09	
Paper communication	1	-0.02	-0.20	0.85	
Telephone communication	1	0.06	0.34	0.74	

Dependent Variable: Organizational Commitment					
	<i>F</i>	<i>df</i>	<i>p</i>	<i>R</i> ²	
	5.66	328	.0001	.124	
Parameter Estimates					
<i>Variable</i>	<i>df</i>	<i>Beta</i>	<i>T</i>	<i>p</i> > <i>T</i>	
Intercept	1	16.53	7.21	.00	
# friends	1	0.02	0.73	.47	
Gender	1	0.89	1.47	.14	
Org. position	1	-0.88	-4.08	.00	
Tenure	1	-0.00	-0.25	.80	
Computer communication	1	0.02	0.22	.83	
Paper communication	1	-0.08	-0.83	.41	
Telephone communication	1	0.03	0.18	.85	
Interaction of computer and shift work	1	0.19	3.50	.00	

constraints, it might prove a particular benefit to employees who are isolated in time: shift workers.⁴ In this city, the shift workers are fire and police personnel and their dispatchers. These employees must work shifts to provide 24-hour coverage for the city.

There were 78 shift workers who responded to the questionnaire. The shift workers' response rate (48%) was lower than that of nonshift workers (68%), though still within an acceptable range. The lower response rate might be explained by the tendency for shift workers to be less committed to the organization than are nonshift workers (X for shift workers' commitment = 13.46 and X for nonshift workers = 16.19 ($T(369) = 4.12, p < .001$)). The police department was one of the initial test beds for the electronic mail system and has had access to it longer than any other department, though both police and fire personnel have been using electronic mail for at least 3 years.

First-order correlations are presented in Table 1, broken down by shift work status. It can be seen from these two matrices that the relationship of computer communication to commitment is stronger for the 76 shift workers than it is for the 300 nonshift workers.

One way to determine if this is true is to include an interaction term in the regression equation. That is, computer communication should be more closely related to organizational commitment for shift workers than it would be for nonshift workers. The second section of Table 2 presents the regression to test this hypothesis. Again, position in the hierarchy is a significant predictor of commitment. However, there is no independent effect for computer communication, while the interaction between computer communication and shift work status is highly significant.

A more straightforward way to understand this interaction is to compute separate regressions for shift workers and nonshift workers. Table 3 presents these regressions.

As can be seen from Table 3, the only mode of communication that significantly predicts organizational commitment is computer communication by shift workers. Position in the hierarchy predicts commitment for nonshift workers, and is at best a marginal predictor of commitment for shift workers. This makes the picture more clear: When

⁴The fire personnel are also the only employees who are isolated by space from the city government, being stationed at various locations in the city. One might expect this physical isolation to be attenuated by computer mail, but in this population, temporal and physical isolation are confounded and a test of the effects of physical isolation cannot be performed. Regressions on shift workers run without the fire personnel show similar patterns to those presented here, and provide evidence that the effect of temporal isolation is present even when controlling for its confounding with physical isolation.

Table 3

Regressions of Commitment Split by Shift Work Status

Dependent Variable: Organizational Commitment for Shift Workers					
	<i>F</i>	<i>df</i>	<i>p</i>	<i>R</i> ²	
	1.49	68	.186	.146	
Parameter Estimates					
<i>Variable</i>		<i>df</i>	<i>Beta</i>	<i>T</i>	<i>p</i> > <i>T</i>
Intercept		1	14.77	2.03	.05
# friends		1	-0.02	-0.30	.77
Gender		1	1.64	0.92	.36
Org. position		1	-1.94	-1.32	.19
Tenure		1	0.00	-0.13	.89
Computer communication		1	0.46	2.49	.02
Paper communication		1	-0.16	-0.72	.48
Telephone communication		1	0.02	0.05	.96

Dependent Variable: Organizational Commitment for Nonshift Workers					
	<i>F</i>	<i>df</i>	<i>p</i>	<i>R</i> ²	
	4.39	259	.0001	.109	
Parameter Estimates					
<i>Variable</i>		<i>df</i>	<i>Beta</i>	<i>T</i>	<i>p</i> > <i>T</i>
Intercept		1	17.91	7.04	.00
# friends		1	0.04	1.10	.27
Gender		1	1.04	1.62	.11
Org. position		1	-0.89	-4.13	.00
Tenure		1	0.00	-0.48	.63
Computer communication		1	0.07	0.79	.43
Paper communication		1	-0.08	-0.71	.48
Telephone communication		1	0.06	0.28	.77

controlling for position in the hierarchy, the only mode of communication that predicts organizational commitment is computer communication by shift workers.

What is the nature of the relationship between computer communication and organizational commitment? One hypothesis is that computer communication provides useful information about the organization, a person's job, and other persons in the organization, and thus increases the employee's sense of belonging. The first section of Table 4 presents a regression to test this hypothesis.

This regression is computed only for shift workers, since it is already evident that it is only among these workers that the relationship between communication and commitment exists. Surprisingly, there is no relationship between feelings of "being informed" and computer communication. This makes it difficult to argue, at least in this case, that it is the informative function of computer communication that produces commitment.

On the other hand, it is possible that the behavioral commitment of initiating communication with others will produce an attitudinal attraction toward those others. This is the path suggested by Kiesler's (1971) theory of behavioral commitment. One way to test this hypothesis is presented in Table 4. In our questionnaire, respondents were asked to indicate how often they *sent* and *received* computer mail. When these two factors are used to predict organizational commitment, it is evident that amount of mail *sent* is what predicts commitment, not amount received. This is consistent with the relationship hypothesized by Kiesler (1971) and Salancik (1977).

Discussion

We found that computer communication was related to commitment, while telephone and memo communication were not. The data and theory reviewed in the introduction would lead one to expect a relationship between *all* modes of communication and commitment, but we presented several reasons why computer communication might be expected to evidence this relationship most strongly. Namely, it provides several advantages (informality, ease of interaction, asynchrony) that the other modes do not.

The fact that shift workers were the ones who evidenced this relationship most strongly argues that some of these advantages are important, particularly those that allow communication between temporally

Table 4

Regressions of informed, Mail Sent, and Mail Received (for Shift Workers Only)

Dependent Variable: How Informed Do You Feel (Shift Workers Only)					
	<i>F</i>	<i>df</i>	<i>p</i>	<i>R</i> ²	
	1.05	68	.409	.107	
Parameter Estimates					
<i>Variable</i>		<i>df</i>	<i>Beta</i>	<i>T</i>	<i>p</i> > $ T $
Intercept		1	4.69	1.65	.10
# friends		1	-0.01	-0.28	.78
Gender		1	0.94	1.35	.18
Org. position		1	0.22	0.39	.69
Tenure		1	-0.01	-1.64	.11
Computer communication		1	0.04	0.60	.55
Paper communication		1	-0.05	-0.59	.56
Telephone communication		1	-0.16	-1.08	.28
Dependent Variable: Organizational Commitment (Shift Workers Only)					
	<i>F</i>	<i>df</i>	<i>p</i>	<i>R</i> ²	
	2.31	67	.045	.185	
Parameter Estimates					
<i>Variable</i>		<i>df</i>	<i>Beta</i>	<i>T</i>	<i>p</i> > $ T $
Intercept		1	19.21	2.90	.01
# friends		1	0.02	0.30	.76
Gender		1	1.30	0.75	.45
Org. position		1	-2.06	-1.45	.15
Tenure		1	-0.02	-1.09	.28
Computer mail sent		1	0.26	1.79	.07
Computer mail received		1	0.04	0.77	.44

separated individuals. Why should we find the relationship of computer communication and commitment to be most strongly evidenced among shift workers? Because in this setting they have the most to benefit from computer communication. They are isolated temporally from other workers, and an asynchronous medium of communication offers them the possibility of transcending that temporal isolation in a mode of communication that is personal and informal.

Even if we tentatively accept the proposition that computer communication is related to organizational commitment, there are still questions to be answered regarding the nature of that relationship. One could claim that the relation is a variation of the "Hawthorne effect." Since the computer mail system is new and closely identified with the city's image as a progressive community, employees who are particularly committed to the city (and to the city's image) might be expected to use computer mail more than uncommitted employees. On the other hand, uncommitted employees might view the system with suspicion and be less willing to use it. Thus, this description is based on commitment causing communication. Though this explanation sounds convincing, it presents one major drawback: It does not explain the strength of the relationship for shift workers. That is, why should disaffection with the organization produce low computer mail use for only the shift workers? Since the data presented here are correlational, we cannot rule out the possibility of commitment increasing computer communication, and it could well be that the relationship is bidirectional. Time lag or experimental data would help to unravel this difficulty.

The introduction presented two ways that communication could produce commitment. It could be that the information people receive is the important factor in increasing commitment or it could be that active participation in the communication network produces commitment. If computer communication provides information which in turn increases commitment, we would expect computer communication to predict feelings of being informed. However, none of the communication modes successfully predicted these employees' feelings of being informed. In addition, if information receipt is a precursor of commitment, one would expect that the number of computer messages *received* would predict commitment. As can be seen in Table 4, number of messages *received* does not predict commitment. We must conclude that the data in this study do not support information receipt as a mediator in the relationship between communication and commitment.

If active participation in communication is associated with increases in commitment, then the number of computer messages *sent* should predict commitment, and in fact, that is the relationship found in the data. The data are thus consistent with the proposition that it is active participation in communication that produces or reflects organizational commitment.

Limitations

Clearly, a 63% response rate means that 37% chose not to respond to the survey. What danger does this pose for conclusions regarding the opinions of the city's employees in general? Employees who did not use electronic mail and employees that were not committed to the city were represented in our sample. Thirty-three percent reported using a computer less than 1 hour a day, 6% of the respondents never use mail, 15% answered below a 9 on the 27-point commitment scale (i.e., less than a 3 on all three 10-point subscales). In addition, 59% of the respondents felt there were some negative effects of electronic mail. Thus, these results were not produced by a subset of employees in the city who were uniformly enthusiastic about and involved in computing.

Most of the theories about the relationship between communication and commitment are causal in nature, predicting increases in commitment as a function of increases in certain types of communication. Unfortunately, the data presented here are only correlational and cannot be used to unequivocally establish causation. It is likely that causation is bidirectional, with increases in commitment causing increased communication and vice versa. The data do allow us, however, to choose between alternative causal theories that predict specific correlational patterns. For instance, we have argued that these data support the view that commitment is related to active participation in communication rather than the mere reception of information.

Because we were interested in mediated communication in this study, we did not collect data on face-to-face interaction patterns. If we had done so, we might have found a relationship between this direct mode of contact and commitment to the organization. In an investigation of communication in work groups, Finholt, Sproull, and Kiesler (1988) found that members who sent the most electronic mail and members who talked most in face-to-face meetings were more likely to be committed to the work group. In addition, Finholt et al. found that prolific senders of

electronic mail were indistinguishable from prolific talkers in terms of their commitment to the group.

It is interesting to note that in the present study, shift workers—who have restricted access to face-to-face communication—were the group that showed the most robust relationship between electronic communication and commitment to the organization. Since the shift workers studied here were primarily fire and police personnel, these results may not be generalizable to other groups of shift workers. In addition, we do not know to whom the shift workers were sending electronic mail. Was the electronic mail sent to superiors or to peers? If the majority of their electronic mail was sent to their superiors, it might imply a narrowing of status differences (Sproull & Kiesler, 1986). Studies which incorporate other shift work occupations with access to electronic mail and which track the recipients and content of the mail are needed to establish the generality of this effect.

Though the response rate for the shift workers was lower (48%), this can be explained by the (not surprising) lower organizational commitment of shift workers. In order to claim that the correlation between commitment and communication for shift workers is an artifact of this lower response rate, one would have to argue that the survey disproportionately excluded shift workers who were committed but did not send electronic mail and shift workers who sent electronic mail but were not committed to the city. We think this is unlikely. A practical issue that further studies will need to address is ensuring a high response rate for shift workers in spite of their lower organizational commitment.

Conclusions

Though the variance explained in all these models is small (the largest R^2 for the whole sample is .12) the pattern of the results is clear. In these data, the relationship between communication and organizational commitment is dependent upon the mode of communication used and the temporal isolation of the employee. This makes it evident that communication should be viewed as a multidimensional construct. Roberts and O'Reilly (1979) have shown differences based upon the *content* of the network, and this research has shown differences based upon the *mode* of communication. By taking the multidimensionality of communication in account, we may be better able to specify the nature of the communication-commitment relationship. In addition, there are multiple groups within an organization to which one can be committed and different

types of commitment one can experience to those groups (Reichers, 1985, 1986; Morrow, 1983; Mowday, Porter, & Steers, 1982). Thus, it is probable that both communication and organizational commitment are multi-dimensional. Further attempts to relate communication to organizational commitment will need to take into consideration the multidimensionality of both constructs.

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