This article analyzes the role of communicator style, other media use, and organizational level in influencing the adoption, use, and evaluation of computer-mediated communication (CMC) in two organizations. Although overall, communicator styles have only a very weak influence, the *relaxed* and *precise* styles (in the hypothesized direction) and the *friendly* style (opposite to the hypothesized direction) do maintain some slight associations in multivariate analyses. Although the characteristics of media suggested by theories of social presence and information richness provide some foundation for these influences, other CMC characteristics and organizational contexts, as well as other approaches, also provide useful frameworks for understanding the slight role of communicator style.

COMMUNICATOR STYLE, MEDIA USE, ORGANIZATIONAL LEVEL, AND USE AND EVALUATION OF ELECTRONIC MESSAGING

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This research takes an individual-level communication orientation by considering the roles of media characteristics, communicator style, and traditional organizational level in influencing the adoption, use, and evaluation of computer-mediated communication (CMC) systems. It does not, however, attempt to test or develop a complete model of new media use or effects (see, for example, Fulk & Steinfield, 1990; Reinsch & Beswick, 1990; Rice, 1987, in press; Rice & Associates, 1984; Saunders & Jones, 1990; Sitkin, Sutcliffe, & Barrios-Choplin, in press).

The argument is simple. As discussed most explicitly in social presence and information richness theories, various characteristics

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associated with different media have implications for choice and outcomes. For example, visual and oral media such as face-to-face conversation convey more social and nonverbal cues, allow more interpretation, and can be used to resolve equivocal situations better than textual media such as written memos of CMC. Thus we can infer that individuals who have communicator styles that require or involve more interaction responsiveness, visual and nonverbal cues, or ambiguity, are less likely to adopt, use, or positively evaluate CMC. Further, individuals who use more face-to-face channels of communication such as meetings are less likely to adopt, use, or positively evaluate an electronic yet text-based medium such as CMC. And, to the extent that these individuals have higher-level organizational positions (and thus are more likely to have equivocal tasks and use face-to-face channels), they are thus less likely to adopt, use, or positively evaluate CMC.

THEORETICAL FRAMEWORK

MEDIA CHARACTERISTICS

Media have been characterized as having various degrees of (a) *social presence* based on criteria such as sociability, warmth, personalness, and sensitivity (Rice & Love, 1987; Short, Williams, & Christie, 1976); or (b) *information richness* based on criteria such as speed of feedback, the form of language employed (body, natural, and/or numeric), language variety, and personal focus (Daft & Lengel, 1986; Daft, Lengel, & Trevino, 1987). Other media characteristics include constraints on users, accessibility, bandwidth, interactivity, symbolic value, and network flows (Rice, 1982, 1987; Trevino, Lengel, & Daft, 1987; Zmud, Lind, & Young, 1990).[1]

The social presence and information richness approaches propose that face-to-face communication is the richest medium, followed in order by telephone, written personal, CMC, written formal, and then numerical formal media. Face-to-face has the highest level of information richness because it provides immediate feedback and personal interaction; allows the simultaneous observation of multiple cues, including kinesics, facial expression, and tone of voice; and uses natural language that is high in variety (Daft & Wiginton, 1979). Group communication (such as meetings) may provide and require even higher levels of information richness because of the multiple actors, perspectives, and turn taking involved (Rice & Shook, 1990).

At the other extreme of the media richness continuum, written media and CMC can oversimplify complex problems because they do not provide a means to convey feedback or information concerning personal feelings. Thus, because CMC is primarily a text-based medium, it is typically considered low in social presence or information richness. For example, Kiesler, Siegel, and McGuire (1984) have argued that the lack of nonverbal and social cues in CMC interaction reduces social regulation, leading to disinhibition and occasional overly emotional or asocial interactions. Yet such perceptions of media sociability, appropriateness, or information richness do not depend solely on the medium's technical components but also on preexisting attitudes, context, personal preferences, and familiarity with the medium (Fulk, Steinfield, Schmitz, & Power, 1987; Hiltz & Turoff, 1978; Rice, 1984; Rice & Love, 1987; Rice & Williams, 1984). For example, Rice and Case (1983) found that a university CMC system did not seem as impersonal to experienced computer services personnel or administrative managers who spent more time using the system as it did to administration managers who had little prior computer experience or did not use the system much. Further, such media may be more appropriate for tasks requiring greater amounts of information, reduction of uncertainty, documentation, overcoming situational constraints, and so on.

INDIVIDUAL DIFFERENCES

The next sections summarize how individual differences such as media use, organizational level, and communicator style may influence use and evaluation of CMC systems (Hiltz & Johnson, 1990; Zmud, 1979).

Media Use

How one uses other media may influence perceived use of and outcomes associated with a new medium, due to habitual use, organizational norms, or the fit between the medium's characteristics and the individual's typical communication and information activities (Rice, Grant, Schmitz, & Torobin, 1990). CMC may not be used by those who spend a lot of time communicating face-to-face, because it does not have sufficient information richness or symbolic value. Or CMC may be used by those who handle memos frequently, because it can be substituted or because it complements written communication (such as in scheduling meetings, broadcasting project notices, and so on) (Rice & Steinfield, in press).

Organizational Level

An individual's pattern of current media use is often highly associated with job position. In general, the higher one's level in the organization, the greater percentage time spent interacting with other people, the more that communication is oral (especially face-to-face), and the more the task demands involve equivocal and rapid-feedback communication (Daft & Lengel, 1986; Mintzberg, 1973; Rice & Shook, 1990). Rice and Shook (1990) found one common pattern of media use (participation in meetings) across the four organizations studied and one or two additional patterns (such as reading and writing letters, or CMC use) that together explained approximately half the variance in respondents' hierarchical job positions.

Based on characteristics of media as presumed by information richness and social presence theories, then, we can hypothesize that an individual's adoption, use, and reported positive outcomes of CMC should be associated with

H1a: more time spent with letters, reports, and memos
H1b: less time spent in meetings
H1c: lower organizational level.

Communicator Style

One set of factors has rarely been included in studies of media adoption and use: the intrinsic individual differences of communicators. Such factors might represent some of the habitual, nonconscious influences on media selection (Reinsch & Lewis, 1984), transcend specific contextual influences, and obviate the difficulty in identifying attitudes toward new media that do not themselves change with the use of such media.

There are some recent examples of such an approach. Trevino, Lengel, Gerloff, and Muir (1990) studied the relationship between managers' cognitive style and media choice behavior. Applying information richness theory, the authors concluded that such individual differences can help to explain media choice when task demands such as the equivocality of the communication incident are relatively low. Alexander, Penley, and Jernigan (1991) similarly concluded that whereas self-monitoring had no influence on managers' sensitivity to the appropriateness of communication media, writing apprehension did, under task conditions of low equivocality (although the correlations were generally less than $r = .1$ even in this condition). Both sets of authors proposed that researchers should consider how other personality variables might be strongly related to media choice. However, Russ, Daft, and Lengel (1990) found that managerial characteristics such as tenure/educational level, sender/receiver, and introversion/extroversion had no effect on managers' media choice.

In line with such mixed results, some researchers have found it unlikely that any set of communicator characteristics, or intrinsic dispositions in general, could provide much predictive power across situations (Mischel, 1973; Roloff, 1980; Spitzberg & Cupach, 1984). Nevertheless, trait measures have certain characteristics that are important to recognize. First, traits contribute to situation-specific behavior insofar as they assess the general propensity of an individual to behave in a certain way in any given episode. Second, the validity of a trait index depends on whether it is conceptualized on the basis of single-act or multiple-act psycho-

logical measures (Daly, 1978; Hewes & Haight, 1979; Mischel, 1968). An individual may be disposed to exhibit a certain degree of the trait dimension in a behavioral pattern rather than being disposed to perform specific behaviors. Third, the strategy and types of variables one considers in attempting to predict and understand behavior will depend on the type of behavioral criterion one is trying to predict and understand (Jaccard & Daly, 1980). Andersen's (1987) review of communication-related traits provides considerable evidence of the theoretical and empirical utility of such measures, as well as likely contingent and moderating influences.

Thus communicator style offers a potential additional component to consider in models of new media use. The communicator-style construct attempts to indicate general propensities to use one of several styles more or less consistently when similar situations arise. It can be used to emphasize the potential role of human communication abilities and propensities in understanding adoption, use, and evaluation of a new communication medium. Communicator style is a measure of the consistently recurring patterns of communication behavior by which one verbally, nonverbally, and paraverbally interacts to signal how literal meaning should be taken, interpreted, filtered, or understood (Klauss & Bass, 1982; Norton, 1983). Norton (1978, 1983) and others provide extensive descriptions of the theoretical foundations, motivations, reliability, and validity of 11 communicator style measures (CSMs).

Use of a medium might be associated with an individual's communicator style because of the extent of information richness or social presence associated with the medium. For example, Williams (1975) demonstrated significant media effects on evaluation of conversation and (less strongly) on evaluation of the conversational partner. Norton noted that Williams's findings suggest that "more immediate media permit a wider range of the person's style of communication to influence his or her evaluation by others" (Norton, 1983, p. 208). Walther (in press) concluded that groups using CMC initially had less developed impressions of other group members compared to the impressions among face-to-face group members, although over time the gap narrowed.

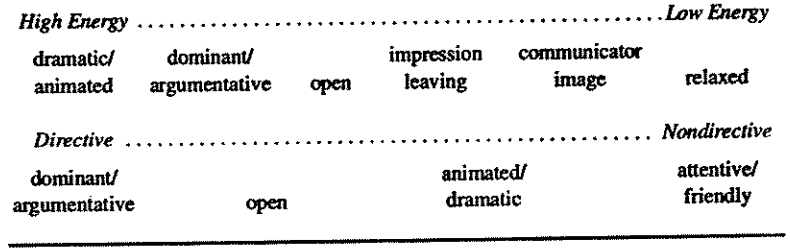

Figure 1: Theoretical Underlying Dimensions of Communicator Styles

Some researchers have tentatively clustered the CSMs onto two dimensional continua, as indicated in Figure 1 (Hansford & Hattie, 1987; Norton, 1983, pp. 80, 105-106). The first continuum is anchored at one end by nondirective communicative activity (*attentive* and *friendly* styles) and at the other end by directive communication activity (*dominant* and *argumentative* styles). The second continuum is anchored at one end by high-energy communication activity (*dramatic* and *animated*) and at the other end by a lower energy style that reflects a state of already released tension (*relaxed*).

The proposed energy and directiveness dimensions of communication styles provide a parsimonious way to identify hypothesized influences of communicator styles on CMC adoption, use, and outcomes. It seems plausible that high-energy styles (dramatic, animated) require greater expressiveness and information richness than low-energy styles (relaxed). A text-based medium cannot easily convey high-energy cues such as pace, volume, intonation, and emotion. Therefore, individuals with such styles should be slightly less likely to adopt, use, and positively evaluate CMC. And because nondirective styles (attentive, friendly) require more responsiveness and equal interaction than do directive styles (dominant, argumentative), individuals with such styles should also be less likely to adopt, use, and positively evaluate CMC. Finally, because CMC provides both the ability to convey detail and asynchronous feedback, which allows communicators to prepare their messages and responses, individuals with precise styles should be more likely to adopt, use, and positively evaluate CMC.

Thus we can hypothesize that an individual's adoption, use, and reported positive outcomes of CMC should be slightly associated with

H2a: less dramatic communicator style
H2b: less animated communicator style
H2c: more relaxed communicator style
H2d: less attentive communicator style
H2e: less friendly communicator style
H2f: more dominant communicator style
H2g: more argumentative communicator style
H2h: more precise communicator style.

Usage of the CMC System

Finally, the default or simple technological determinist explanation (which ignores situational and individual influences) for CMC evaluations is the extent to which one uses the system.

H3: An individual's reported positive outcomes of CMC are associated with usage of the system.

METHOD

RESEARCH SITES[2]

The first site was a small decentralized federal agency office in charge of providing services and supplies to other agencies. Its 86 employees were all civil servants; approximately 60% were white-collar managers and professionals, with the rest clerical workers. A questionnaire was administered to all employees before and 9 months after implementation of a local area network linking personal computers and providing CMC services. The system was consciously implemented to improve productivity for managers and professional and technical specialists. The sample consists of the 67 of 86 employees (78% response rate) who returned their questionnaires at postimplementation.

The second site was a research and development (R&D) organization of approximately 900 employees. Externally funded research programs frequently crossed departmental boundaries, resulting in cross-boundary communication and collaboration. The CMC system-design philosophy called for a system that supported meetings and work groups as well as the existing cross-departmental orga-nizational structures. Users could enter the name of an employee as the address for a message; hard copies would be printed and delivered if the intended recipient did not have a system account; the system provided gateways to national and international computer networks. All 780 holders of computer accounts at this R&D organization, which had been using the system for nearly 4 years, received a questionnaire through interdepartmental mail. Researchers received 508 (65%) completed and returned usable questionnaires in sealed envelopes. Based on a small sample, about 60% of the nonrespondents indicated that they thought the questionnaire was too personal or that they were too busy, and about 40% were never accessible due to travel.

MEASURES

Communicator Style

The present analyses use mean scores of the 8 (of 11) CSMs described in Table 1.

Media Use

At both sites, respondents were asked to estimate the percentage of an average workday they spent using a variety of communication channels, including the category of not communicating, and they were asked to make sure the percentages totaled 100%. Here, we use only the items measuring percentage of day spent writing or reading letters or memos and attending meetings, which we suggest represent the extremes of media richness or social presence in traditional organizational communication channels.

TABLE 1: Communicator Style Measures and Constituent Items Used in the Present Study

Animated
- My eyes reflect exactly what I'm feeling when I communicate.
- I tend to constantly gesture when I communicate.
- I am very expressive nonverbally in social situations.
- I actively use a lot of facial expressions when I communicate.

Attentive
- I can always repeat back to a person exactly what was meant.
- Uusally, I deliberately react in such a way that people know that I am listening to them.
- I really like to listen very carefully to people.
- I am an extremely attentive communicator.

Argumentative
- When I disagree with somebody I am very quick to challenge them.
- I am very argumentative.
- Once I get wound up in a heated discussion I have a hard time stopping myself.
- It bothers me to drop an argument that is not resolved.

Dominant
- In most social situations I generally speak very frequently.
- I am dominant in social situations.
- I try to take charge of things when I am with people.
- In most social situations I tend to come on strong.

Dramatic
- I dramatize a lot.
- Regularly I tell jokes, anecdotes, and stories when I communicate.
- Often I physically and vocally act out what I want to communicate.
- I very frequently verbally exaggerate to emphasize a point.

Friendly
- I readily express admiration for others.
- To be friendly, I habitually acknowledge verbally others' contributions.
- I am always an extremely friendly communicator.
- Whenever I communicate, I tend to be very encouraging to people.

Precise
- I am a very precise communicator.
- In arguments I insist on very precise definitions.
- I like to be strictly accurate when I communicate.
- Very often I insist that other people document or present some kind of proof for what they are arguing.

Relaxed
- I have some nervous mannerisms in my speech.*
- I am a very relaxed communicator.
- The rhythm or flow of my speech is sometimes affected by my nervousness.*
- Under pressure I come across as a relaxed speaker.

NOTE: Questionnaire scale: 1 = strongly agree to 5 = strongly disagree. All but those items marked with an asterisk (*) were reversed (6-item value) for the analyses to maintain positive directionality in the scale meanings.

Organizational Level

At the government site, respondents indicated their organizational level on the questionnaire accordingly: 1 = executive/top management, 2 = middle management, 3 = supervisor, 4 = staff—professional, 5 = staff—technical, 6 = clerical, and 7 = other. For this site, we have no independent verification of the reliability of respondents' self-coding on this measure.

At the R&D site, respondents indicated their job title and department on the questionnaire. The head of the R&D organization's personnel department then coded these 54 job descriptions, using personnel criteria such as pay scale and job classification, into one of five broad, ranked organizational levels: 1 = top and senior management, 2 = middle management, 3 = researcher staff, 4 = technical staff, 5 = administrative staff, 6 = clerical, and 7 = other. For both sites, the 7 category was dropped, and the remaining values were subtracted from 7 so that the measures ranged from 1 (lowest level) to 6 (highest level).

Adoption and Usage of Electronic Messaging

Examples of tasks conducted via CMC at the government site included sending electronic memos about updated governmental procedures or coordinating responses to clients' complaints. Eveland and Bikson (1987) analyzed CMC network data from 100 of the users in the R&D site, finding that 75% of the messages crossed departmental boundaries, indicating high collaboration and communication among research disciplines within broad organizational functions, whereas only 40% of the messages crossed specific research project boundaries.

There are two self-reported measures of electronic mail usage from each site, both derived from a question asking the respondent to indicate the percentage of the day spent using electronic mail. The two are (a) a binary measure of adoption, equal to 0 if the respondent reported not using the CMC system at all and 1 otherwise; and (b) for users only, level of usage, equal to the percentage of day spent using the CMC system.

For the government site, CMC usage was normally distributed (Kolmogorov-Smirnov [K-S] $z = 1.65$). For the R&D site, usage was not normally distributed (K-S $z = 3.8$), so it was transformed. The best transformation was $\log_{10}$; even then the distribution was still not quite normally distributed (K-S $z = 2.99$).

At the R&D site only, there are also two computer-monitored measures of CMC use. The R&D site's host computer monitored individual account usage continuously, including the number of messages sent and received in each of five 4-week periods over the 14-month period that preceded the questionnaire administration. Those respondents who sent at least one message in any of the five periods were categorized as *computer-monitored adopters*. *Computer-monitored level of usage* was the number of (nonzero) messages sent since first logon. This variable was not normally distributed (K-S $z = 4.48$), so it was transformed by using the $\log_{10}$ (K-S $z = .63$). (See the discussion below about these two kinds of data measuring adoption and usage.)

Outcomes

For both sites, the questionnaire asked respondents to indicate the extent to which the CMC system significantly changed (a) quality of work, (b) number of contacts initiated, and (c) ability to get a message to the right person. These three items were then subjected to principal components analysis to identify dimensionality, using only those respondents who had adopted the CMC (self-report or monitored), because the evaluations assume at least some experience with the system. For the government site, two principal components resulted, with the third item loading separately on the second factor. For the R&D site, all three items loaded on a single principal component. Factor scores were computed and added to the case records.

Descriptive Statistics, Reliabilities, Factor Loadings, and Bivariate Correlations

In Tables 2 and 3, wordings and ranges, descriptive statistics, factor loadings, and scale alpha reliabilities of the items from the respective sites are listed. Relevant bivariate correlations from the respective sites are found in Tables 4 and 5.

TABLE 2: Government Site: Descriptive Statistics and Factor Loadings

Variables	*Mean*	SD	*Reliabilities or Factor Loadings*		N
			Alpha reliability		
Communicator style scales					
Animated	3.02	.66	.66		63
Argumentative	2.79	.80	.76		63
Attentive	3.32	.75	.75		63
Dominant	2.76	.68	.71		63
Dramatic	2.62	.70	.58		63
Friendly	2.55	.75	.75		63
Precise	3.13	.80	.78		63
Relaxed	3.22	.85	.76		63
Percentage media use in average day					
Letter/memo writing/reading	13.34	12.36			65
Meetings	5.78	6.07			65
Organizational level					
Top management					4
Middle management					8
Supervisor					4
Professional staff					22
Clerical staff					13
Other					12
Electronic mail usage (reported)					
Percentage of day (users only)	11.58	13.00			43
Percentage of day (all respondents)	7.66	11.94			65
Adoption of EMS[a]	.66	.06			65
			Factor loadings		
Performance components[b] (users only)					
Quality of work	4.32	.79	.81	–.27	41
Number of contacts initiated	3.76	.79	.85	.19	42
Ability to get message to person	3.59	1.01	–.02	.97	41
Eigenvalues			1.39	1.03	
Percentage variance explained			46	34	

a. 1 = any use of electronic mail, 0 = otherwise.

b. Scale values from 1 = significantly decreased to 5 = significantly increased. Principal components analysis was used to identify factors. Regression method was used to create factor scores. Descriptive statistics and factor loadings based on CMC users only.

TABLE 3: R&D Organization Site: Descriptive Statistics and Factor Loadings

Variables	*Mean*	SD	*Reliabilities or Factor Loadings*	N
			Alpha reliability	
Communicator style scales				
Animated	3.14	.68	.65	486
Argumentative	2.72	.76	.67	487
Attentive	3.46	.60	.58	487
Dominant	2.65	.78	.81	486
Dramatic	2.88	.75	.68	486
Friendly	3.63	.64	.69	487
Precise	3.25	.70	.68	487
Relaxed	3.11	.82	.80	487
Percentage media use in average day				
Letter/memo writing/reading	10.64	12.08		384
Meetings	7.51	8.64		384
Organizational level				
Top management				13
Middle management				23
Researcher				180
Technical staff				83
Administrative staff				46
Clerical				111
Other (missing)				32
Electric mail usage (reported)				
Percentage of day (users only)	6.47	6.03		284
Log_{10} percentage of day	.63	.42		284
Adoption of EMS[a]	.60	.49		488
Electric mail usage (computer monitored)				
Messages sent (users only)	143.8	350.8		291
Log_{10} messages sent since first use	1.54	.78		291
Adoption of EMS[a]	.66	.47		439
			Factor loadings	
Performance components[b] (users only)				
Quality of work	3.31	.67	.71	366
Number of contacts initiated	3.42	.72	.70	366
Ability to get message to person	3.87	1.03	.77	366
Eigenvalues			1.59	
Percentage variance explained			53	

a. 1 = any use of electronic mail, 0 = otherwise (respectively for self-reported and computer-monitored measures).
b. Scale values from 1 = significantly decreased to 5 = significantly increased. Principal components analysis was used to identify factors. Regression method was used to create factor scores. Descriptive statistics and factor loadings based on set of self-reported or monitored CMC users only.

TABLE 4: Government Organization Site: Bivariate Correlations

Variables and Hypothesized Relation		*All*[a]	*Users Only*[b]		
			Outcome		
		Adoption	*Usage*	*Quality/Contacts*	*Message*
Communication style, encoding					
Relaxed	+	.00	−.15	−.01	−.02
Dramatic	−	.08	.00	−.05	−.08
Animated	−	.07	−.12	.20	−.10
Precise	+	−.17	.00	−.08	.19
Communication style, decoding					
Dominant	+	−.17	.35**	.25	.08
Argumentative	+	−.08	.10	−.10	.26
Attentive	−	−.07	−.30*	.01	−.01
Friendly	−	−.07	.28*	.25	−.24
Organizational level					
Media use	−	.29**	.09	.20	−.03
Meetings	−	.35**	−.03	.15	−.35*
Letters	+	.06	−.06	−.05	.19
Usage of electronic mail	+	—	—	.25	.06

NOTE: Adoption analyses use all respondents. Usage and outcome analyses use only those respondents who used the CMC system. Associations for adoption and usage analyses are Spearman correlations because dependent variables are binary or non-normally distributed. Associations for outcome (except for correlation of CMC usage and outcome) analyses are Pearson correlations.
a. $N = 63$.
b. $N = 37$ to 40.
*$p < .05$; **$p < .01$; all significance tests are one-tailed.

MULTIVARIATE RESULTS

Discriminant analyses predicting adoption and regression analyses predicting usage and outcomes were run using only variables with statistically significant bivariate correlations, both for parsimony and to avoid further loss of statistical power.[3]

PREDICTING ADOPTION: DISCRIMINANT ANALYSES

Government Site

Only the percentage of day spent in meetings loaded significantly (positively) on the one discriminant function predicting

TABLE 5: R&D Organization Site: Bivariate Correlations

Variables and Hypothesized Relationship		*All*		*Users Only*			
		Adoption		*Usage*		*Outcome*	
		Self-Report[a]	*Behavior*[a]	*Self-Report*[b]	*Behavior*[c]	*Self-Report*[b]	*Behavior*[c]
Communication style, encoding							
Relaxed	+	.02	−.13**	−.16**	.02	−.14*	−.10*
Dramatic	−	.00	.03	.09*	.04	.14*	.08*
Animated	−	.00	.05	.02	.03	.07	.10*
Precise	+	.06*	−.06	.08*	.01	.09*	.11*
Communication style, decoding							
Dominant	+	.01	.00	.00	−.05	.05	.02
Argumentative	+	−.04	.04	.04	−.03	.13*	.06
Attentive	−	−.02	−.08*	.11*	−.09*	.04	.01
Friendly	−	.06*	.03	.06	−.02	.10*	.02
Organizational level							
Media use	−	.10**	−.08*	.01	.09*	.10*	.13*
Meetings	−	.13**	.03	.09*	.12**	.09*	.13**
Letters	+	.04	.09*	.00	.13**	−.17**	−.12**
Usage of electronic mail[d]	+	—	—	—	—	.44*	.15*

NOTE: Adoption analyses use all respondents. Usage and outcome analyses use only those respondents who used (self-reported or behavior measures) the CMC system. Associations for adoption and self-reported use analyses are Spearman correlations because dependent variables are binary or non-normally distributed. Associations for behavioral use and both outcome analyses are Pearson correlations (except for correlation of self-reported CMC usage and outcome).

a. $N = 355$ to 383.

b. $N = 197$ to 209.

c. $N = 187$ to 197.

d. Both self-reported and computer-monitored measures of CMC usage were transformed by using the logarithm$_{10}$.

*$p < .05$; **$p < .01$; all significance tests are one-tailed.

TABLE 6: Discriminant Analyses Predicting Adoption (0, 1)

Independent Variables	*Standardized Canonical Discriminant Coefficients*
(A) Government site: Self-reported adoption	
Meetings	.22*
Organizational level	.40 ($p < .06$)
N	79
Overall canonical correlation	.32*
χ^2	6.34*
Percentage correctly classified	
Nonadopters	67
Adopters	67
(B) R&D site: Self-reported adoption	
Meetings	.84***
Organizational level	.29*
N	455
Overall canonical correlation	.18***
χ^2	14.44***
Percentage correctly classified	
Nonadopters	61
Adopters	57
(C) R&D site: Computer-monitored adoption	
Relaxed communication style	−1.00**
N	414
Overall canonical correlation	.14**
χ^2	8.1**
Percentage correctly classified	
Nonadopters	51
Adopters	56

*$p < .05$; **$p < .01$; ***$p < .001$, based on univariate *F* ratio.

self-reported adoption of CMC (see Table 6A), although organizational level almost loaded significantly as well ($p < .06$). The canonical correlation was .32, and the function correctly classified 67% of both adopters and nonadopters.

R&D Site

Self-reported adoption was associated positively with one canonical function, consisting of meetings and organizational level

(see Table 6B). The canonical correlation was .18 ($p < .001$), and the function correctly classified 57% of adopters and 61% of nonadopters. Computer-monitored adoption was associated with one canonical function, consisting only of the (non)relaxed communication style (see Table 6C). Meetings was positively associated with adoption, but it did not reach statistical significance ($p < .06$). The canonical correlation was .14 ($p < .001$), and the function correctly classified 56% of the adopters but only 51% of the nonadopters.

PREDICTING USAGE AND OUTCOMES: STEPWISE REGRESSION ANALYSES[4]

Government Site

Level of usage was predicted (significance threshold set at $p < .10$; see Note 3) only by the friendly style (positively) ($R^2 = 5\%$) (see Table 7A). Note that although adoption was predicted by other media use and organizational level, the extent to which adopters used CMC was predicted solely by a communication-style individual difference.

The quality/contacts outcome score was not significantly predicted by any variable (although the dominant style, the friendly style, and CMC usage all were correlated with this score at $r = .25$), and the message outcome score was predicted only by meetings (negatively) ($R^2 = 12\%$).

R&D Site

For self-reported adopters, level of usage was predicted by the relaxed style (negatively) and time spent in meetings (positively) ($R^2 = 4\%$) (see Table 7B). For computer-monitored adopters, number of messages sent was predicted by meetings (positively) and letters (positively) ($R^2 = 3\%$).

For self-reported adopters, the outcome score was predicted by letters (negatively) and usage (positively) ($R^2 = 20\%$). For computer-

TABLE 7: Regression Results

Dependent Variable	*Independent Variables*	*Beta Coefficient*	*Adjusted* R^2	df	F *ratio*
	(A) Government site[a]				
Usage					
Reported usage	Friendly	.28†	.05	1,37	3.1†
Outcomes					
Quality/contacts	None				
Message	Meetings	–.37*	.12	1,35	5.7*
	(B) R&D site				
Usage					
Reported usage	Relaxed	–.20**			
	Meetings	.15**	.04	2,280	7.6***
Monitored usage	Meetings	.22**			
	Letters	.16*	.03	2,280	5.4**
Outcomes					
Outcome factor—reported users	Reported usage	.42***			
	Letters	–.14*	.20	2,281	37.0***
Outcome factor—computer-monitored users	Monitored usage	.20***			
	Meetings	.16**			
	Letters	–.13*			
	Relaxed	–.13*			
	Precise	.11†	.09	5,273	7.6**

NOTE: Values are standardized beta coefficients from stepwise multiple regressions. Analyses use all respondents who reported adopting CMC, or all respondents for whom computer-monitored number of messages sent indicated they behaviorally adopted CMC, respectively.

a. Regressions were run with the significance threshold set at $p < .1$ because of the small sample size; see also Note 3.

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

monitored adopters, the outcome score was predicted by the number of messages sent (positively), meetings (positively), letters (negatively), relaxed style (negatively), and at $p < .06$, the precise style (positively) ($R^2 = 9\%$).

DISCUSSION

IMPLICATIONS FOR THE CONSTRUCTS

Communicator Style

Each of the communicator-style measures had at least one statistically significant bivariate association with one or more of the dependent variables in one or both of the sites. However, in the multivariate analyses, only the relaxed style had an influence on adoption (in the R&D site), friendly and relaxed styles had an influence on usage (in the government and R&D sites, respectively), and relaxed style influenced the outcome factor (in the R&D site), although the precise style approached a statistically significant influence on the outcome factor (in the R&D site). Thus communicator style plays quite a small role in explaining adoption, usage, and evaluation of the CMC system. Further, the direction of the influence of both the friendly and the relaxed styles is in the opposite direction of the hypotheses, at least as based on the role of media characteristics presumed by social presence and information richness theories.

The direction of the friendly style influence provides evidence against the position many critics of new media take: that CMC systems *necessarily* depersonalize relations and filter out socioemotional cues. Much like Rice and Love's (1987) findings that nearly 30% of a public computer bulletin board's content was socioemotional, this result implies that CMC *may* facilitate social uses and allow expression of admiration, acknowledgement of others' contributions, friendly communication, and encouragement of others.

The reverse influence of the relaxed style indicates that the high energy/low energy distinction may have the opposite relevance to understanding CMC, because the styles at the other end of the continuum (dramatic and animated) had positive bivariate influences (joke telling, physical emphasis, verbal exaggeration; gestures, eyes, and facial expressions; respectively).

Thus a general explanation for the potential role of communicator styles may be that a CMC system typically requires users to take action but simultaneously depends on users receiving responses, in order for it to support ongoing communication (Rice, 1982), yet it leaves the choices about these actions up to the users. Users must be proactive in both receiving and sending their messages by accessing systems and commands, instead of being able to react spontaneously as in face-to-face communication. This is one plausible explanation for why the lower-energy relaxed style would be negatively associated with CMC use and evaluation. Individuals with communicator styles that involve taking the time to think about and respond to others (that is, the friendly or attentive styles) may find CMC systems supportive, counter to information richness and social presence theories. This is because they can consider the others' communication without the pressure to respond immediately or lose conversational turn. Aspects of the friendly style (such as "habitually acknowledging others" and "encouraging others") and the attentive style ("repeating" and "deliberate react") represent aspects of CMC message responses that could motivate other users to return more messages. Such responses would increase the possibility of the critical mass of users that is necessary for a system to be worthwhile and thus would also lead to more positive evaluation of the system (Markus, 1987b; Rice, 1987). Also, people who prefer to communicate in a precise manner may find CMC systems supportive, because they also can proactively take time to organize and present their thoughts in as "documented" and "accurate" a form as they desire, in written form, without having to worry about being interrupted or becoming engaged in longer conversations, if they so desire.

It is possible, as Alexander et al. (1991), Rice et al. (in press), and Trevino et al. (1990) found in their studies, that individual differences (here, communicator style) have a slightly larger influence in conditions of low equivocality and low analyzability because in such conditions, individuals are less constrained by the information processing demands of the task. However, the mixed and weak associations across the two sites indicate that, regardless of the theoretical explanation, communicator style has no more than a slight influence on adoption, use, and evaluation of CMC systems.

Organizational Level

In both sites, those who occupied higher positions in the organization were more likely to adopt the CMC system (although in the R&D site, only for those identified as adopters based on the self-reported usage measure). These generally similar results contradict the implication of information richness theory that individuals higher in the organizational hierarchy will not use or positively evaluate CMC (because of their more frequent use of face-to-face communication and their greater task equivocality). However, organizational level did not persist as an influence in the multivariate analyses.

Media Use

The primary media influence was time spent in meetings, which was positively associated with adoption in both sites, negatively associated with the messages outcome score in the government site and positively with the full outcome score in the R&D site. Again, most of these results are counter to the implications of information richness and social presence theories because meetings involve considerable face-to-face interaction, equivocality, interaction, status and social cues, and turn taking.

Further, as noted above, in many organizations job levels can be distinguished primarily by extent of participation in meetings, and in some organizations also by different specific media (Rice & Shook, 1990). So the different directions of associations involving meetings in the two sites may indicate the importance of organizational norms and differences concerning using different media. For example, in the small government office, it may be easier to maintain contact with groups of people outside of meetings through face-to-face communication than through CMC (explaining the negative influence on the message outcome factor), but at the project-driven R&D site, it may be more difficult to maintain cross-departmental contact with groups of people outside of meetings without CMC.

In the R&D site, percentage of time spent reading and writing letters and memos was positively associated with computer-monitored CMC usage but negatively associated with the outcome factor. We might interpret this as indicating that for individuals with habits or tasks involving written text, CMC seems appropriate because of its similar media characteristics, but that unless many of these text-based activities can be conducted over CMC, the additional information and communication fostered by the text-based computer channel might actually reduce performance.

Direct Influence of System Usage

In the government site, usage did not have an independent influence on the outcome factors in the multivariate context, indicating, as Rice and Case (1983) argued, that there may not be a direct, deterministic influence of system usage on system evaluation. This lack of statistically significant influence may be due to the small sample size, however, because the bivariate association of usage with the first outcome factor was $r = .25$, also nonsignificant but intermediate in strength compared to the two significant bivariate associations for the R&D site. In the R&D site, both reported and computer-monitored CMC usage did have a strong positive influence on the reported evaluation factor, independent of the other variables' influences. Thus, although there are many other direct and moderating factors to consider, it seems reasonable to expect that system usage should have some direct influence on evaluations of the system.

IMPLICATIONS FOR RELATED RESEARCH

Stability of Intrinsic Differences Such as Communicator Style

The present research, like Norton's work (1983), assumes communicator styles are fairly stable personality traits and thus generally unaffected by use of a new medium. However, Ezirim-Onyejekwe's (1989) cross-sectional study found significant differences between communicants' reporting of their styles when they thought of communication as computer mediated (higher for argumentative, friendly, impression leaving, and precise, and lower for open) or not computer mediated. Other CMC studies that involved related intrinsic differences such as self-awareness (Matheson & Zanna, 1988) found over-time changes in attributions of machine-like qualities to on-line communication partners (Shamp, 1989) and impression formation (Walther, in press). To the extent that use of a new medium involves cognitive and affective processes, arousal and activation, or moderator variables hypothesized to influence the stability of traits (Andersen, 1987), communicator style might vary. However, these studies are not sufficient to support or reject the proposition that CMC use affects individuals' communicator styles.

Measures of CMC Usage

Two different issues relating to CMC use arise from these analyses. The first is that adoption represents a different phenomenon than level of CMC usage. Reasons for not adopting CMC are not simply the reverse of the reasons for greater usage of CMC. Insofar as it is crucial to have a sufficient number of early adopters to make a CMC system valuable and to influence other organizational members to adopt the system (Markus, 1987b), initial implementation strategies should differ from later strategies intended to increase amount or diversity of CMC usage.

The second issue concerns the different sources of usage data in the R&D site—self-reported versus computer monitored. There are three aspects of this issue. The first aspect concerns measurement. The difference between data source (respondent and computer) is

confounded with the difference in what they are measuring. Self-reported usage measures an estimated, averaged percentage of time during an average day spent using CMC, combining in some unknown way messages sent and messages received. Computer-monitored usage measures total, aggregated number of messages sent. So it should be no surprise that these two measures are only moderately correlated (for users only, the two untransformed measures had a nonparametric $r = .33$, $p < .001$, whereas the two transformed measures are essentially uncorrelated, with $r = .09$, n.s.). The second aspect concerns differential influence. There was a slight tendency for the communicator style variables to have greater influence on self-reported usage than on computer-monitored usage. However, computer-monitored usage had a greater influence on the outcome factor than self-reported usage, for the respective samples of respondents. That is, communicator style may be associated more with individuals' perceptions or recollections of usage behavior than with actual behavior, a possibility that indicates a common-method bias. And the third aspect concerns samples. The self-reported adopters overlap with, but do not perfectly correspond with, computer-monitored adopters (see Rice, Hughes, & Love, 1989, for an analysis of this aspect).

Thus, as discussed elsewhere (Rice, 1990; Rice & Borgman, 1983; Rice & Shook, 1988; Williams, Rice, & Rogers, 1988, chap. 6), self-reported and computer-monitored measures represent different aspects and conceptualizations of CMC use, and they are associated differentially with the dependent variables, representing slightly different sets of users. Computer-monitored behavioral measures are highly reliable but not necessarily more valid than self-reported usage. Thus future studies should collect both kinds of measures and attempt to refine our understanding of these two indicators of the CMC system usage.

CONCLUSION

As in other studies noted above, social presence and information richness theories appear useful in conceptualizing potential

differences among media, but they are too extreme and narrow in practice (see, especially, Rice et al., in press). As Rice (1987) and Trevino et al. (1987) argue, perhaps those aspects of communicative expression that would be considered information rich, such as nonverbal cues and immediacy, and their related communication styles are not crucial to much day-to-day organizational communication—at least as related to one's communicator style. Rather, overcoming constraints to communication, and the extent to which communication requires or allows proactive, high-energy communication, may be stronger influences.

As with another important new medium in its time—the telephone (Marvin, 1988)—it is entirely likely that regardless of what researchers, social critics, and ordinary folk think about CMC during its introduction into organizations and society, people with varying communicator styles will come to use this medium for a wide variety of purposes and accept it as just one of many possibilities for communicating with other people.

NOTES

1. Some researchers criticize the presupposition that these media characteristics are either objective or constant, and thus they reject any assumption that individuals can consistently choose media on these criteria (Fulk et al., 1987). However, these approaches do not necessarily presuppose intentional or rational choice in selecting a medium for each communication situation or require such choice for different media to affect communication differently. Even under conditions of habitual, required, or unintentional use, these characteristics may still be useful in explaining outcomes of using different media. However, those who are also more aware of the congruence of media and tasks are slightly more likely to make appropriate choices and achieve effective communication (Daft et al., 1987; Rice et al., in press; Rice, Hughes, & Love, 1989).

2. Additional details concerning the government site appear in Rice and Contractor (1990), Rice, Grant, Schmitz, and Torobin (1990), Rice et al. (in press), Rice and Shook (1990), and Rice and Torobin (1986). Additional details and analyses concerning the R&D organization site appear in Eveland and Bikson (1988), Markus (1987a), Rice, Hughes, and Love (1989), and Rice and Shook (1990).

3. Assuming that an average effect size for the influence of a communicator style is $r = .15$, then, when comparing that effect to the null effect of $r = .00$, the following statistical power levels result: for the government site, all respondents $B = .31$, CMC users only $B = .26$; for the R&D site, all respondents $B = .90$, CMC users only $B = .70$ (using Guenther, 1973, pp. 397, 503).

4. It may be argued that stepwise regressions are inappropriate for two reasons. First, results only include those variables sufficiently statistically significant to be "kept in" the final equations. However, as noted in the introduction to the Multivariate Results section, using and reporting only statistically significant variables can be justified on the basis of parsimony and statistical power. In any event, the bivariate correlations indicate to some extent the low or not significant associations involving these variables.

The second criticism might be that stepwise regression does not impose any theoretical ordering on the importance of the independent variables. With either a stronger theoretical base or a stronger interest in particular sets of variables, one can use hierarchical regression to force variables into the equation as part blocks or sets of variables in a preferred sequence, essentially allocating maximum variance to prior sets of variables. We feel that there is insufficient theory to justify this approach here, and we are essentially dispassionate as to the salience of the various influences.

However, for those interested, we cryptically summarize results from hierarchical regressions. Again, only those variables with statistically significant bivariate correlations were used. Then blocks of those variables, when appropriate, were entered in the following order: communicator style, media use, job level, and, when appropriate, system usage. The following summaries indicate the dependent variables, each independent variable with its standardized beta coefficient and significance level, along with the adjusted R^2, the F ratio, and its significance level.

GOVERNMENT SITE

Usage:

(.21) Friendly + (.29*) Dominant – (.05) Attentive [$R^2 = .04$, $F = .1.7$]

Quality/Contacts:

(.18) Dominant + (.13) Level + (.31*) Meetings [$R^2 = .12$, $F = 3.1$*]

Message:

(–.30†) Meetings + (.08) Level + (.06) Meetings [$R^2 = .02$, $F = 1.3$]

R&D SITE

Reported Usage:

(–.23***) Relaxed + (.03) Dramatic + (.07) Precise + (.07) Attentive + (.13†) Meetings – (.01) Level [$R^2 = .04$, $F = 3.1$**]

Monitored Usage:

(–.07) Attentive + (.13†) Meetings + (.14*) Letters + (.07) Level [$R^2 = .03$, $F = 3.5$**]

Outcome Score, Reported Adopters:

(.03) Argumentative – (.08) Relaxed + (.06) Dramatic + (.02) Precise – (–.11†) Letters + (.04) Meetings + (.07) Level + (.40***) Usage [$R^2 = .21$, $F = 9.7$***]

Outcome Score, Monitored Adopters:

(–.13*) Relaxed + (.09) Animated + (.10† Precise – (.01) Dramatic + (.13†) Meetings – (.14*) Letters + (.05) Level + (.20***) Usage [$R^2 = .09$, $F = 4.5$***]

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

The results are largely the same, except for the expected decrease in statistical significance of some of the variables (especially Meetings) and *F* levels. Substantively, the only changes are that the dominant style replaces the friendly style in predicting usage, and Meetings is a significant influence on Quality/Outcomes, both for the government site.

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